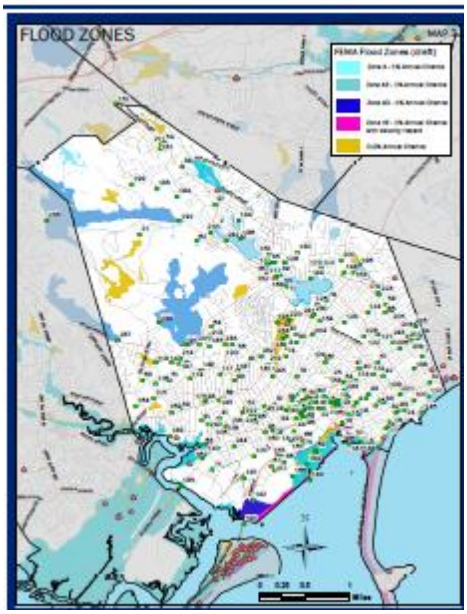
CITY OF LYNN
HAZARD MITIGATION PLAN UPDATE



Metropolitan Area Planning Council

Draft for Review by MEMA & FEMA
June 5, 2012

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CITY OF LYNN HAZARD MITIGATION PLAN

ACKNOWLEDGEMENTS AND CREDITS

This plan was prepared for the City of Lynn by the Metropolitan Area Planning Council (MAPC) under the direction of the Massachusetts Emergency Management Agency (MEMA) and the Massachusetts Department of Conservation and Recreation (DCR). The plan was funded by the Federal Emergency Management Agency's (FEMA) Pre-Disaster Mitigation (PDM) Grant Program.

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Hazard Mitigation planning is a proactive effort to identify actions that can be taken to reduce the dangers to life and property from natural hazard events. In the communities of the Boston region of Massachusetts, hazard mitigation planning tends to focus most on flooding, the most likely natural hazard to impact these communities. The Federal Disaster Mitigation Act of 2000 requires all municipalities that wish to be eligible to receive FEMA funding for hazard mitigation grants, to adopt a local multi-hazard mitigation plan and update this plan in five year intervals.

Planning Process

Planning for the Lynn Hazard Mitigation Plan update was led by the Lynn Local Hazard Mitigation Planning Committee, composed of staff from a number of different City Departments. This committee discussed where the impacts of natural hazards most affect the City, goals for addressing these impacts, and hazard mitigation measures that would benefit the City.

Public participation in this planning process is important for improving awareness of the potential impacts of natural hazards and to build support for the actions the City takes to mitigate them. Two advertised public meetings were held, the first on September 13, 2011 with the Lynn Planning Board and the second on February 28, 2012 with the City Council Public Safety Committee. The draft Plan also was posted on the City's website for public review and comment for a ten day period following the two public meetings and completion of the first draft of the Plan. The City Council meeting was televised live and re-broadcast. Both meetings included a description of the hazard mitigation planning process, an overview of the plan and proposed mitigation actions, as well as directions on how the public could access the draft plan on the City website and make comments. The public was given time to ask questions and comment at all public meetings.

Preceding these meetings, a public, regional meeting of the North Shore Multiple Hazard Community Planning Team was held February 8, 2010 to re-introduce participating communities to the hazard mitigation planning process and to identify inter-community hazard mitigation issues. A follow-up inter-regional public meeting and Natural Hazard Mitigation workshop was held on September 14, 2011 in Danvers, sponsored by MEMA , MAPC and MA Coastal Zone Management.

A list of those submitting public comments can be found in Appendix C.

Risk Assessment

The plan update provides risk assessment for the following natural hazards in Lynn: flooding, wind, including hurricanes and Northeasters, brush fires, tornados, landslides and earthquakes.

Hazard Mitigation Goals

1. Ensure that critical infrastructure sites are protected from natural hazards.

2. Protect existing residential and business areas from flooding.

3. Maintain existing mitigation infrastructure in good condition.

4. Continue to enforce existing zoning and building regulations.

5. Educate the public about zoning, flooding and building regulations, particularly with regard to changes in regulations that may affect tear-downs and new construction.

6. Encourage future development in areas that are not prone to natural hazards.

7. Educate the public about natural hazards and mitigation measures.

8. Make efficient use of public funds for hazard mitigation.

9. Protect the City's ability to respond to various natural hazard events.

Highlighted Potential Hazard Mitigation Actions

- Install wave attenuator at Seaport Landing facility.
- Upgrade the storm drain system along Surfside Road.
- Upgrade the Valley Road drainage culvert.
- Conduct a study on how to prevent flooding, inflow and infiltration, and backup in the Lower Western Interceptor sewer line.
- Conduct drainage and flooding study for the Bridge Street area to prevent flooding.
- Finish mapping all stormwater outfalls and catch basins on GIS.

Plan Review and Update Process

Table 1 Plan Review and Update

Chapter	Reviews and Updates
III – Public Participation	The Lynn Local Committee placed an emphasis on public participation for the update of the Hazard Mitigation Plan, discussing strategies to enhance participation opportunities at the first local committee meeting. During plan development, the plan was presented to the Planning Board and the City Council in public meetings. The City Council's meeting was televised and re-broadcast. The plan was also available on the City's website for public comment.
IV – Risk Assessment	MAPC gathered the most recently available hazard and land use data and met with City staff to identify changes in local hazard areas and development trends. City staff reviewed critical infrastructure with MAPC staff in order to create an up-to-date list. MAPC also used the most recently available version of HAZUS and assessed the potential impacts of flooding using the latest data.
V - Goals	The Hazard Mitigation Goals were reviewed and endorsed by the Local Hazard Mitigation Committee.
VI – Existing Mitigation Measures	The list of existing mitigation measures was updated to reflect current mitigation activities in the City.
VII & VIII – Hazard Mitigation Strategy	Mitigation measures from the 2005 plan were reviewed and assessed as to whether they were completed, on-going, or deferred. The Local Committee determined whether to carry forward measures into the 2012 plan or delete them. The 2012 Hazard Mitigation Strategy reflects both new measures and measures carried forward from the 2005 plan. The Committee re-prioritized all of these measures based on current conditions
IX – Plan Adoption & Maintenance	This section of the plan was updated with a new on-going plan implementation review and five year update process that will assist the City in incorporating hazard mitigation issues into other City planning and regulatory review processes and better prepare the City to update the plan in 2017.

As indicated in more detail on Table 15, Lynn made considerable progress on implementing mitigation measures identified in the 2005 Hazard Mitigation Plan. Many of the measures identified in that plan are now considered on-going aspects of the regular work of City staff from the department head level to the regular work of Public Works

staff. Individual projects have been incorporated into the City's capital improvement plan and the City continues to seek FEMA grant funding to implement the home elevation program. Moving forward into the next five year plan implementation period there will be many more opportunities to incorporate hazard mitigation into the City's decision making processes.

II. INTRODUCTION

Planning Requirements under the Federal Disaster Mitigation Act

The Federal Disaster Mitigation Act, passed in 2000, requires that after November 1 2004, all municipalities that wish to continue to be eligible to receive FEMA funding for hazard mitigation grants, must adopt a local multi-hazard mitigation plan and update this plan in five year intervals. This planning requirement does not affect disaster assistance funding.

Massachusetts has taken a regional approach and has encouraged the regional planning agencies to apply for grants to prepare plans for groups of their member communities. The Metropolitan Area Planning Council (MAPC) received a grant from the Federal Emergency Management Agency (FEMA) under the Pre-Disaster Mitigation (PDM) Program, to assist the City of Lynn and eight other North Shore communities to update their local Hazard Mitigation Plans, which were first adopted in as part of a North Shore Multi-Jurisdictional Hazard Mitigation Plan. The local Hazard Mitigation Plan updates produced under this grant are designed to individually meet the requirements of the Disaster Mitigation Act for each community.

In order to address multijurisdictional and regional issues, the participating municipalities were afforded the opportunity to meet with their neighboring communities during plan development. A public, regional meeting of the North Shore Multiple Hazard Community Planning Team was held February 8, 2010 to re-introduce participating communities to the hazard mitigation planning process and to identify inter-community hazard mitigation issues. MAPC has also produced a regional document that summarizes the issues and recommendations for the North Shore communities.

In addition, Lynn was able to participate in a North Shore Natural Hazard Mitigation Plan Workshop held on September 14, 2011, sponsored jointly by MEMA, MA Coastal Zone Management and MAPC staff. The workshop was designed to help assist communities draft successful PDM plans, as well as providing a forum for sharing individual community plans on a regional basis; exploring inter-community questions, challenges and how to address them. See Appendix C for a list of those submitting comments on the draft Plan.

What is a Hazard Mitigation Plan?

Natural hazard mitigation planning is the process of determining how to systematically reduce or eliminate the loss of life and property damage resulting from natural hazards such as floods, earthquakes, and hurricanes. Hazard mitigation means to permanently reduce or alleviate the losses of life, injuries, and property resulting from natural hazards through long-term strategies. These long-term strategies include planning, policy changes, programs, projects, and other activities.

Previous Federal/State Disasters

The City of Lynn has experienced 17 natural hazards that triggered federal or state disaster declarations since 1991. These are listed in Table 2 below. The vast majority of these events involved flooding.

Table 2 Previous Federal/State Disaster Declarations

DISASTER NAME (DATE OF EVENT)	TYPE OF ASSISTANCE	DECLARED AREAS
Hurricane Bob (August 1991)	FEMA Public Assistance Project Grants	Counties of Barnstable, Bristol, Dukes, Essex, Hampden, Middlesex, Plymouth, Nantucket, Norfolk, Suffolk
	Hazard Mitigation Grant Program	Counties of Barnstable, Bristol, Dukes, Essex, Hampden, Middlesex, Plymouth, Nantucket, Norfolk, Suffolk (16 projects)
No-Name Storm (October 1991)	FEMA Public Assistance Project Grants	Counties of Barnstable, Bristol, Dukes, Essex, Middlesex, Plymouth, Nantucket, Norfolk
	FEMA Individual Household Program	Counties of Barnstable, Bristol, Dukes, Essex, Middlesex, Plymouth, Nantucket, Norfolk
	Hazard Mitigation Grant Program	Counties of Barnstable, Bristol, Dukes, Essex, Middlesex, Plymouth, Nantucket, Norfolk, Suffolk (10 projects)
December Blizzard (December 1992)	FEMA Public Assistance Project Grants	Counties of Barnstable, Dukes, Essex, Plymouth, Suffolk
	Hazard Mitigation Grant Program	Counties of Barnstable, Dukes, Essex, Plymouth, Suffolk (7 projects)
March Blizzard (March 1993)	FEMA Public Assistance Project Grants	All 14 Counties

DISASTER NAME (DATE OF EVENT)	TYPE OF ASSISTANCE	DECLARED AREAS
January Blizzard (January 1996)	FEMA Public Assistance Project Grants	All 14 Counties
May Windstorm (May 1996)	State Public Assistance Project Grants	Counties of Plymouth, Norfolk, Bristol (27 communities)
October Flood (October 1996)	FEMA Public Assistance Project Grants	Counties of Essex, Middlesex, Norfolk, Plymouth, Suffolk
	FEMA Individual Household Program	Counties of Essex, Middlesex, Norfolk, Plymouth, Suffolk
	Hazard Mitigation Grant Program	Counties of Essex, Middlesex, Norfolk, Plymouth, Suffolk (36 projects)
1997	Community Development Block Grant-HUD	Counties of Essex, Middlesex, Norfolk, Plymouth, Suffolk
June Flood (June 1998)	FEMA Individual Household Program	Counties of Bristol, Essex, Middlesex, Norfolk, Suffolk, Plymouth, Worcester
	Hazard Mitigation Grant Program	Counties of Bristol, Essex, Middlesex, Norfolk, Suffolk, Plymouth, Worcester (19 projects)
(1998)`	Community Development Block Grant-HUD	Counties of Bristol, Essex, Middlesex, Norfolk, Suffolk, Plymouth, Worcester
March Flood (March 2001)	FEMA Individual Household Program	Counties of Bristol, Essex, Middlesex, Norfolk, Suffolk, Plymouth, Worcester
	Hazard Mitigation Grant Program	Counties of Bristol, Essex, Middlesex, Norfolk, Suffolk, Plymouth, Worcester (16 projects)
February Snowstorm (Feb 17-18, 2003)	FEMA Public Assistance Project Grants	All 14 Counties
January Blizzard (January 22-23, 2005)	FEMA Public Assistance Project Grants	All 14 Counties

DISASTER NAME (DATE OF EVENT)	TYPE OF ASSISTANCE	DECLARED AREAS
Hurricane Katrina (August 29, 2005)	FEMA Public Assistance Project Grants	All 14 Counties
May Rainstorm/Flood (May 12-23, 2006)	Hazard Mitigation Grant Program	Statewide
April Nor'easter (April 15-27, 2007)	FEMA Public Assistance Project Grants	Barnstable, Berkshire, Dukes, Essex, Franklin, Hampden, Hampshire, Plymouth
	Hazard Mitigation Grant Program	Statewide
Flooding (March, 2010)	FEMA Public Assistance FEMA Individuals and Households Program SBA Loan	Bristol, Essex, Middlesex, Suffolk, Norfolk, Plymouth, Worcester
	Hazard Mitigation Grant Program	Statewide

(Source: database provided by MEMA)

FEMA Funded Mitigation Projects

Over the last 20 years the City of Lynn has received funding from FEMA for one mitigation project under the Hazard Mitigation Grant Program. . The project is summarized in Table 3 below.

Table 3 FEMA-Funded Mitigation Projects
(Utilizing the Hazard Mitigation Grant Program)

Project Title	Scope of Work	Total Cost	Federal Funding	Local Funding
Drainage Infrastructure Improvements	(1) installation of 770' of 3' x 5' concrete box culvert from Stetson Street to Granite Street (2) video inspection of Strawberry Brook	$786,339.00	$540,353.00	$0.00

(Source: database provided by MEMA, 2010)

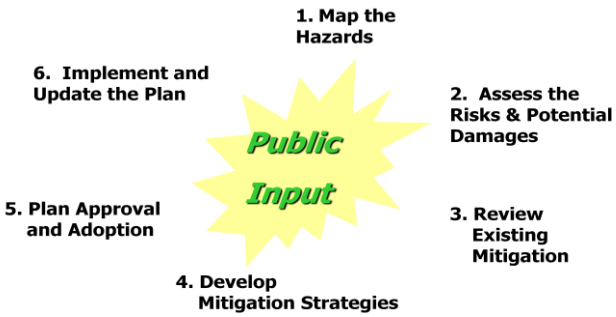
Community Profile

Lynn is a city in Essex County, Massachusetts, United States. The population was 90,329 at the 2010 census. An old industrial center, Lynn is home to Lynn Beach and Lynn Heritage State Park and is about 7 miles (11 km) north of downtown Boston.

Originally settled in 1629, Lynn played a major role in the regional tannery and shoe-making industries from the nineteenth through the mid-twentieth centuries. In 1850, the northern section of Lynn, attracting wealthy patrons and growing as a resort town, seceded and became the town of Swampscott. Lynn continued to expand and thrive as an industrial center until the 1950s, when it began to decline, much like many other Massachusetts urban centers. Several large fires devastated part of the downtown area in the 1970s and 1980s, which have since been redeveloped into a campus of the North Shore Community College. Lynn remains home to several large national employers such as General Electric, Garelick Farms, and Durkee-Mower, makers of "Marshmallow Fluff". In the early 2000s, a number of new development projects contributed to what officials hope will be the city's renaissance. Industrial buildings that were formerly vacant have been converted into loft spaces by real estate developers, and bought by young home-buyers who seek the urban lifestyle of Boston proper. City Hall is encouraging the community's resurgence, with new antique-style lighting, signage, brickwork, and a multipurpose municipal football stadium. Lynn is also actively implementing its 2007 Waterfront Master Plan to spur economic revitalization within the City.
(Narrative from Wikipedia and 2007 Lynn Waterfront Master Plan Report)

III. PUBLIC PARTICIPATION

MAPC employs a six step planning process based on FEMA's hazard mitigation planning program focusing on local needs and priorities but maintaining a regional perspective matched to the scale and nature of natural hazard events. Public participation is a central component of this process, providing critical information about the local occurrence of hazards while also serving as a means to build a base of support for hazard mitigation activities. This process is illustrated and described below.



1. Map the Hazards – MAPC relies on data from a number of different federal, state, and local sources in order to map the areas with the potential to experience natural hazards. This mapping represents a multi-hazard assessment of the municipality and is used as a set of base maps for the remainder of the planning process. A particularly important source of information is the knowledge drawn from local municipal staff on where natural hazard impacts have occurred, which is collected. These maps can be found in Appendix B.

2. Assess the Risks & Potential Damages – Working with local staff, critical facilities, infrastructure, vulnerable populations, and other features are mapped and contrasted with the hazard data from the first step to identify those that might represent particular vulnerabilities to these hazards. Land use data and development trends are also incorporated into this analysis. In addition, MAPC develops estimates of the potential impacts of certain hazard events on the community.

3. Review Existing Mitigation – Municipalities in the Boston Metropolitan Region have an active history in hazard mitigation as many have adopted flood plain zoning districts, wetlands protection programs, and other measures as well as enforcing the State building code, which has strong provisions related to hazard resistant building requirements. All current municipal mitigation measures must be documented.

4. Develop Mitigation Strategies – MAPC works with the local municipal staff to identify new mitigation measures, utilizing information gathered from the hazard identification, vulnerability assessments, and the community's existing mitigation

efforts to determine where additional work is necessary to reduce the potential damages from hazard events. Additional information on the development of hazard mitigation strategies can be found in Chapter VII.

5. Plan Approval & Adoption – Once a final draft of the plan is complete it is sent to MEMA for the state level review and, following that, to FEMA for approval. Typically, once FEMA has approved the plan the agency issues a conditional approval with the condition being adoption of the plan by the municipality. More information on plan adoption can be found in Chapter IX and documentation of plan adoption can be found in Appendix D.

6. Implement & Update the Plan – Implementation is the final and most important part of any planning process. Hazard Mitigation Plans must also be updated on a five year basis making preparation for the next plan update an important on-going activity. Chapter IX includes more detailed information on plan implementation.

Public participation occurred at four levels; the North Shore Multiple Hazard Community Planning Team (regional committee) and the Lynn Multiple Hazard Community Planning Team (local committee). In addition, the City held two advertised meetings open to the general public to present the plan and hear citizen input. Following the presentation of the draft plan at the two public meetings, the draft was placed on the City website for ten days for public comment and questions. Commenters are listed in Appendix C.

In addition, Lynn was able to participate in a North Shore Natural Hazard Mitigation Plan Workshop held on September 14, 2011, sponsored jointly by MEMA, MA Coastal Zone Management and MAPC staff. The workshop was designed to help assist communities draft successful PDM plans, as well as providing a forum for sharing individual community plans on a regional basis; exploring inter-community questions, challenges and how to address them. See Appendix C.

Lynn's Participation in the Regional Committee

On January 15, 2010, a letter was sent notifying the communities of the first meeting of the North Shore Regional Committee and requesting that the Chief Elected Official designate a minimum of two municipal employees and/or officials to represent the community. The following individuals were appointed to represent Lynn on the regional committee:

Joseph Powers	Fire Chief/Emergency Management Director
Paul Flanagan	Fire Captain and Deputy Emergency Management Director

The regional committee serves as an opportunity for neighboring communities to discuss hazard mitigation issues of shared concern. The North Shore Regional Committee met on February 8, 2010 at the Saugus Public Safety Building. At that meeting, representatives from each of the nine North Shore communities beginning the process of reviewing and

revising their 2005 Natural Hazard Mitigation Plans were re-introduced to the following items:

- The Massachusetts State Hazard Mitigation Plan and the FEMA hazard mitigation planning and grant process;
- The concept of each community engaging staff and the public to update its current Natural Hazard Mitigation Plan;
- FEMA plan overview and requirements and plan eligibility;
- Review of the overall scope of work and plan revision schedule
- Question and of Discussion of local issues, inter-community and North Shore Region hazard mitigation issues and how to address.
- Re-introduction to identifying and mapping municipal Critical Facilities, municipal Areas of Concern, Inter-Community Areas of Concern, and Regional Shared areas of Concern.
- Municipal representatives were also briefed on the importance of trying to create a diversified presence on the local Multiple Hazard Community Planning Team in advance of local team meetings, being asked to contact major employers, business owners, schools and non-profit organizations to participate in the process.

In addition, as the same group of MAPC staff is working on each community's plan, these issues of shared concern, and other issues that may arise between neighboring communities, are discussed in greater detail in local committee meetings and resulting actions reflected in the identified mitigation measures, as noted in Chapter VIII.

The Local Multiple Hazard Community Planning Team

In addition to the regional committee meetings, MAPC worked with the local community representatives to organize a local Multiple Hazard Community Planning Team for Lynn (local committee). MAPC briefed the local representatives as to the desired composition of that team as well as the need for representation from the business community and citizens at large.

The Local Multiple Hazard Community Planning Team Meetings

On March 15, 2011 and May 10, 2012 MAPC conducted the meeting of the Lynn Local Committee. The purpose of the meetings was to review the existing plan and mitigation goals, including gathering information on local hazard mitigation issues, updating existing mitigation practices, and determining the status of mitigation measures from the 2005 plan. The meeting also included discussion of new or modified mitigation measures and a process for public involvement and outreach. Table 4 lists the attendees at each meeting of the team. The agenda for these meeting is included in Appendix A.

Table 4 Attendance at the Lynn Local Committee Meeting	
Name	**Representing**
March 15, 2011	
Michael Murray	Lynn Office of Economic and Community Development
Joe Zukas	Lynn Fire Department
Jack Barry	Lynn Fire and Emergency Management Departments
Manny Alcantara	Lynn Department of Public Works
Andrew Hall	Lynn Water and Sewer Commission
Mary Ann O'Connor	Lynn Public Health Department
Chris Reddy	Lynn Police Department
James McDonald	Lynn Fire Department
May 10, 2012	
Joe Zukas	Lynn Fire Department
Thomas Hines	Lynn Emergency Management and Fire Departments
Don Walker	Lynn Office of Economic and Community Development
Joe Carritte	Lynn Department of Public Works
Mary Chalmers	Mayor's Office
Bill Murray	Lynn Fire Department
Andrew Hall	Lynn Water and Sewer Commission
Bill Klag	North Shore Medical Center

Public Meetings

The plan was introduced to the public at two public meetings, both while the draft plan was being completed. The public had an opportunity to provide input to the planning process during a meeting of the Lynn Planning Board on September 13, 2011 held in the Lynn City Hall. The draft plan was also presented for public comment at a meeting of the Lynn City Council Public Safety Committee on February 28, 2012 at the City Hall.

Both the Planning Board and City Council meetings were advertised as public meetings. The attendance list for each meeting can be found in Table 5. I. In addition to staff and elected officials, approximately five people attended the Planning Board meeting and ten at the City Council meeting. In addition, the plan was made available on the City's website for public review following edits by the Lynn Natural Hazard Mitigation Team. MAPC staff announced at both the Planning Board and City Council public meetings that the draft plan would be available for comments and questions for a ten day posting period and encouraged Board members and public attendees to read the plan and submit comments

Table 5
Attendance at Public Meetings

Name	Representing
First Public Meeting	
Paul Price	Lynn Planning Board
Stephen Upton	Lynn Planning Board
Robert Sticia	Lynn Planning Board
James Mahoney	Lynn Planning Board
Michael Donovan	Lynn Planning Board
Sam Cleaves	MAPC
Members of the public	
Second Public Meeting	
Council President Timothy Phelan	Lynn City Council, President
Council Vice-President Richard J. Ford	Lynn City Council, Vice President
Councilor-At-Large Buzzy Barton	Lynn City Council
Councilor-At-Large Daniel F. Cahill	Lynn City Council
Councilor-At-Large Hong Net	Lynn City Council
Ward One Councilor Wayne A. Lozzi	Lynn City Council
Ward Two Councilor William R. Trahant, Jr.	Lynn City Council
Ward Three Councilor Darren P. Cyr	Lynn City Council
Ward Four Councilor Richard C. Colucci	Lynn City Council
Ward Five Councilor Brendan P. Crighton	Lynn City Council
Ward Six Councilor Peter L. Capano	Lynn City Council
Thomas Hines	Lynn EMD
Don Walker	Lynn Office of Economic and Community Development
Sam Cleaves	MAPC
Members of the public	

Other Opportunities for Public Involvement

The draft plan was posted on the City's website for 10 days for public comment. The posting was announced at both the City Council and Planning Board meeting. The City Council meeting outlining the draft plan, how to get involved and how to submit comment on the draft, was televised and re-broadcast. MAPC contacted organizations and individuals suggested by the Lynn NHM Team and let them know that the draft plan was available on the City website for comments and questions. A list of those comments and questions collected on the draft can be found in Appendix C.

IV. RISK ASSESSMENT

The risk assessment analyzes the potential natural hazards that could occur within the City of Lynn as well as the relationship between those hazards and current land uses, potential future development, and critical infrastructure. This section also includes a vulnerability assessment that estimates the potential damages that could result from certain large scale natural hazard events.

Update Process

In order to update Lynn's risk assessment, MAPC gathered the most recently available hazard and land use data and met with City staff to identify changes in local hazard areas and development trends. City staff reviewed critical infrastructure with MAPC staff in order to create an up-to-date list. MAPC also used the most recently available version of HAZUS (described below) and assessed the potential impacts of flooding using the latest data.

Overview of Hazards and Impacts

The Massachusetts Hazard Mitigation Plan 2007 (state plan) provides an in-depth overview of natural hazards in Massachusetts. The state plan indicates that Massachusetts is subject to the following natural hazards (listed in order of frequency); floods, heavy rainstorms, nor'easters or winter storms, coastal erosion, hurricanes, tornadoes, urban and wildfires, drought and earthquakes. Previous state and federal disaster declarations since 1991 are summarized in Table 1.

Table 6 summarizes the hazard risks for Lynn. This evaluation takes into account the frequency of the hazard, historical records, and variations in land use. This analysis is based on the vulnerability assessment in the Commonwealth of Massachusetts State Hazard Mitigation Plan, 2007. The statewide assessment was modified to reflect local conditions in Lynn using the definitions for hazard frequency and severity listed below Table 6.

Table 6
Hazard Risks Summary

Hazard	Frequency	Severity
Flooding	High	Serious
Dam failures	Low	Serious
Winter storms	High	Serious
Hurricanes	Medium	Serious
Tornadoes	Low	Serious
Brush fires	Medium	Minor
Earthquakes	Low	Extensive
Landslides	Low	Minor

Definitions used in the Commonwealth of Massachusetts State Hazard Mitigation Plan

Frequency

Very low frequency: events that occur less frequently than once in 1,000 years (less than 0.1% per year)

Low frequency: events that occur from once in 100 years to once in 1,000 years (0.1% to 1% per year);

Medium frequency: events that occur from once in 10 years to once in 100 years (1% to 10% per year);

High frequency: events that occur more frequently than once in 10 years (greater than 10% per year).

Severity

Minor: Limited and scattered property damage; no damage to public infrastructure (roads, bridges, trains, airports, public parks, etc.); contained geographic area (i.e. one or two communities); essential services (utilities, hospitals, schools, etc) not interrupted; no injuries or fatalities.

Serious: Scattered major property damage (more than 50% destroyed); some minor infrastructure damage; wider geographic area (several communities); essential services are briefly interrupted; some injuries and/or fatalities.

Extensive: Consistent major property damage; major damage public infrastructure damage (up to several days for repairs); essential services are interrupted from several hours to several days; many injuries and fatalities.

Catastrophic: Property and public infrastructure destroyed; essential services stopped, thousands of injuries and fatalities.

Flood Related Hazards

Flooding was the most prevalent serious natural hazard identified by local officials in Lynn. Flooding is generally caused by hurricanes, nor'easters, severe rainstorms, and, thunderstorms. Sea level rise has the potential to exacerbate these issues over time.

Regionally Significant Storms

There have been a number of major floods that have affected the North Shore region over the last fifty years. Significant historic flood events in Lynn have included:

- March 1968
- The blizzard of 1978
- January 1979
- April 1987
- October 1991 ("The Perfect Storm")

- October 1996
- June 1998
- March 2001
- April 2004
- May 2006
- April 2007
- March 2010

These floods were all regionally significant but affected individual communities to varying degrees.

Overview of Coastal Flooding

There are minor hazard zones around each of the ponds and in two low wet areas within Lynn Woods. The most significant locations for flooding exist south of the Lynnway along the Waterfront at Lynn Harbor and along the entire bank of the Saugus River.

The areas of greatest flooding are found along the Lynn Shore Drive in the vicinity of the Nahant rotary, the southern portion of Nahant Street, Surfside Road and Beach Road. Another problem area is the Little River area from River Street to Cooper Street from Western Avenue to the Saugus River. Flooding here is often due to tidal impacts. The drainage system does not function at high tides. The drainage system would need to be raised and a pump station installed. The area that floods is a mixture of residential, commercial and light industrial. Other areas that often experience flooding include near the Sluice Pond Overflow, from Broadway to Magnolia Avenue and Conomo Avenue to Broadway. Linton Road is sometimes impacted by flooding. Areas of flooding are shown on Map 7 in Appendix B.

There is flooding in the eastern part of the City from Fosters Pond in Swampscott. The design of the grate at the headwall is inadequate and it gets blocked with debris. The City of Lynn has offered to replace the grate.

The combined sewer overflow system (CSO) in place in Lynn creates a capacity problem in the drainage system. When there are heavy flows to the treatment plant, the plant is not able to pump as much water and the wet wells flood in the lower areas of the collection system. This situation is being alleviated by sewer separation which will eventually cost in the range of $50 -54 million. Most of the CSO separation work has been completed in the eastern portion of the City.

Information on flood hazard areas was taken from two sources. The first was the National Flood Insurance Rate Maps. The FIRM flood zones are shown on Map 3 in Appendix B. The second was discussions with local officials and residents. The Locally Identified Areas of Flooding described below were identified by City staff as areas where flooding is known to occur. These areas do not necessarily coincide with the flood zones from the FIRM maps. They may be areas that flood due to inadequate drainage systems or other local conditions rather than location within a flood zone. The numbers

correspond to the numbers on Map 8, "Hazard Areas". The numbers do not reflect priority order.

Additional areas of flooding (as identified by the LEPC and other plan participants) are as follows:

Locally Identified Areas of Flooding

1) Surfside Road: low-lying neighborhood with silted drain lines
2) Valley Road: under-sized culvert and blocked upstream outlet
3) Lower Western Interceptor/Drain Line: Combined Sewer Overflow line in low lying area that backs up during heavier precipitation events combining with high tides and coastal surge. This is part of the CSO separation project.
4) Bridge Street at Boston Street: tidal back up of Strawberry Brook during heavy precipitation and coastal surge causes backup.
5) Maple Street at Flax Pond: Pond overtops during spring runoff; outlet is closed off.
6) Cedar Pond: undersized drain line causes flooding.
7) Floating Bridge Pond Outlet: increased runoff from upstream development and now under-sized drainage outlet caused flooding during heavy precipitation events.
8) Alley Street: Combined Sewer Overflow partially caused by inflow and infiltration of groundwater into drainage lines.
9) Johnson Street: Stormwater backup and flooding contributed to by inflow and infiltration into Combined Sewer Overflow line.
10) Silsby Street: low elevation road gathers storm water runoff and floods during heavy precipitation events

Repetitive Loss Structures

There are 15 repetitive loss structures in Lynn, an increase from the 9 structures identified in the 2005 plan. As defined by the Community Rating System (CRS) of the National Flood Insurance Program (NFIP), a repetitive loss property is any property which the NFIP has paid two or more flood claims of $1,000 or more in any given 10-year period since 1978. For more information on repetitive losses see http://www.fema.gov/business/nfip/replps.shtm.

Table 7 below shows the breakdown of structure type by FEMA designated and locally identified flood zones.

Table 7				
Repetitive Loss Properties Summary				
Flood Zone	**Single Family Residential Structures**	**Multi-Family Residential Structures**	**Commercial, Industrial, or Institutional Structures**	**Total Repetitive Loss Properties**
FEMA Zone A	2	2	0	4
FEMA Zone VE	0	0	0	0
FEMA .2% annual chance	0	0	2	2
Total: FEMA Flood Zones	**2**	**2**	**2**	**6**
Alley Street	0	0	0	0
Bridge Road outlet	0	0	0	0
Bridge Street at Boston Street and Strawberry Brook	0	0	0	0
Cedar Pond	1	0	0	1
Coolidge Road	0	0	0	0
Flax Pond at Maple Street	0	0	0	0
Johnson Street	0	0	0	0
Lower Western Interceptor Sewer/Drain Line	0	0	1	1
Magnolia Ave	0	0	0	0
Silsby Street	0	0	0	0
Surfside Road	0	0	0	0
Valley Road	1	0	0	1
Total: Locally Identified Areas of Flooding	**2**	**0**	**1**	**3**

Dams and Dam Failure

There are over 2,500 dams in Massachusetts. The Arm Corps of Engineers and the MA Department of Conservation and Recreation have determined that over 50 of these dams are "structurally unsafe". Three hundred dams, including over 40 of those rated as "High Hazard" dams by DCR's Office of Dam Safety, defines "High Hazard": as: Dams located where failure or mis-operation will likely cause loss of life and serious damage to homes(s), industrial or commercial facilities, important public utilities, main highways(s) or railroad(s).

In addition, DCR also describes "Significant" and "Low Hazard dams as the following:

Significant Hazard: Dams located where failure or mis-operation may cause loss of life and damage home(s), industrial or commercial facilities, secondary highway(s) or railroad(s) or cause interruption of use or service of relatively important facilities.

Low Hazard: Dams located where failure or mis-operation may cause minimal property damage to others. Loss of life is not expected.

Many of the dams in the state date back to the 19th century and were used to help power the industrial revolution, with some dams even going back to the 18th century. These dams, which pose significant risks, must be factored into local hazard mitigation planning under ordinary circumstances. They become an even greater risk under stress from an earthquake, when they could overtop or fail.

In accordance with changes in the Massachusetts dam safety regulations, dam owners are now responsible for registering, inspecting, reporting inspection results to the MA Office of Dam Safety and maintaining their dams in good operating condition.

In 2002 the Massachusetts legislature enacted revisions of the Dam Safety Statute, **MGL Chapt. 253 §§ 44-50**, which significantly changes the responsibilities of dam owners to register, inspect and maintain dams in good operating condition. Amendments to Dam Safety Regulations **302 CMR 10.00-10.16** became effective November 4, 2005 and are reflective of the statutory changes. MGL Chapter 253 and 302 CMR 10.00 requires Emergency Action Plans be prepared, maintained and updated, by dam owners, for High Hazard Potential dams and certain Significant Hazard Potential dams.

The Lynn Comprehensive Emergency Management Plan has a section on dam failure. The plan notes that dam failure in general is infrequent but has the potential for severe impacts.

The Department of Conservation and Recreation (DCR) Office of Dam Safety lists twelve dams located in Lynn. Eight of the dams are rated as high hazard; one is rated as a significant hazard and one as a low hazard.

Table 8 Lynn Dams				
Dam	**Owner**	**Owner Type**	**Rating**	**Condition**
Walden Pond East End Dam	Lynn Water and Sewer	Municipal	High Hazard	Fair
Birch Pond	Lynn Water	Municipal	High Hazard	Fair

Table 8 Lynn Dams				
Dam	**Owner**	**Owner Type**	**Rating**	**Condition**
Dam	and Sewer			
Breed's Pond Outlet Dam #5	Lynn Water and Sewer	Municipal	High Hazard	Poor
Breed's Pond Lantern Rock Dike #4	Lynn Water and Sewer	Municipal	High Hazard	Fair
Breed's Pond Dike #8	Lynn Water and Sewer	Municipal	High Hazard	Satisfactory
Breed's Pond Dike #10	Lynn Water and Sewer	Municipal	High Hazard	Fair
Breed's Pond Dike #11	Lynn Water and Sewer	Municipal	High Hazard	Fair
Breed's Pond Dike #12	Lynn Water and Sewer	Municipal	High Hazard	Fair
Lynn Reservoir Dam	Lynn Water and Sewer	Municipal	Significant Hazard	Satisfactory
Sluice Pond Dam	Lynn	Municipal	Low Hazard	Fair
Hawkes Pond Outlet Dam	Lynn Water and Sewer	Municipal	High Hazard	Fair
Saugus River Dam	Lynn Water and Sewer	Municipal	Low Hazard	Fair

Walden Pond East End Outlet Dam is of earthen construction, a gravity dam. Its length is 2190 feet. Its capacity is 5500 acre feet. Normal storage is 4100 acre feet. It drains an area of 1.7 square miles. Built in 1905, the dam has had adequate levels of maintenance and standard procedures, though listed in only fair condition. There is a formal written Emergency Action Plan on file with the Lynn Emergency Management Department

Birch Pond Dam: The dam is L-shaped, about 80 ft. long and 27 ft. high. The dam is in poor condition. The upstream face is overgrown and eroded, the embankment crest deteriorated and abused by improper usage. It falls within the small size category and in the high hazard category. Failure of the dam would cause a flood through a thickly settled area. The City EMD has an Emergency Action Plan for the dam on file.

Breed's Pond Outlet Dam #5: The dam was built in 1914. Though listed in poor condition, adequate levels of maintenance and standard procedures have been instituted and detailed, updated written Emergency Action Plan (EAP) is available at Lynn EMD and filed with MA DCR.

Breed's Pond Lantern Rock Dike #4: Listed in fair condition; a written EAP is on file with the Lynn EMD. The dam is owned by the Lynn Water and Sewer Commission.

Breed's Pond Dike #8: Listed in satisfactory condition and a written EAP is on file with Lynn EMD. The dam is owned by the Lynn Water and Sewer Commission.

Breed's Pond Dike #10: Listed in fair condition and a written EAP is on file with Lynn EMD. The dam is owned by the Lynn Water and Sewer Commission.

Breed's Pond Dike #11: Listed in fair condition and a written EAP is on file with Lynn EMD. The dam is owned by the Lynn Water and Sewer Commission.

Breed's Pond Dike #12: Listed in fair condition and a written EAP is on file with Lynn EMD. The dam is owned by the Lynn Water and Sewer Commission.

Lynn Reservoir Dam: Listed in satisfactory condition and a written EAP is on file with Lynn EMD. The dam is owned by the Lynn Water and Sewer Commission.

Sluice Pond Dam: Construction was completed in 1900. It is owned by the City of Lynn. Sluice Pond Dam is of earthen construction, a gravity dam. Its length is 130 feet. Its capacity is 322 acre feet. Normal storage is 210 acre feet. It drains an area of 1.8 square miles. Listed as being in fair condition and classified as Low Hazard, there is no EAP for this dam on file.

Hawkes Pond Outlet Dam is of earthen construction, rock fill, a gravity dam. Its length is 1270 feet. Its capacity is 1250 acre feet. Normal storage is 850 acre feet. It drains an area of 1.8 square miles. Construction was completed in 1895. It is owned by Lynn Water and Sewer. A written EAP is on file with Lynn EMD for this dam.

Saugus River Dam: Located at the Wakefield/Lynnfield line on the Saugus River, this dam is low hazard and is not required to maintain an EAP.

All of the dams owned by the Lynn Water and Sewer Commission (LWSC) are critical to the water supply and are maintained and inspected on a regular basis.

The LWSC inspected all of its dams and dikes in 2003 and submitted a report to the DEM Office of Dam Safety. This report identified all rehabilitation work required at each dam. The Walden Pond dams were rehabilitated in 1999-2000 and the Hawkes Pond Dams were rehabilitated in 1997-1998. Birch Pond Dam, Breeds Pond Dam at Lantern Rock and Breeds Pond Outlet Dam have all been rehabilitated since 2005.

Wind Related Hazards

Wind related hazards include hurricanes and tornadoes as well as high winds during severe rainstorms and thunderstorms. As with many communities damage to buildings and cars, tree loss and falling limbs, including downed power lines, are a serious hazard in Lynn.

Removal of trees diseased trees and the potential for power loss and electrical safety due to tree blow downs on power lines and streets remains a concern for Lynn, as it did in its 2005 Plan.

Table 9 - The Effect of Wind Speed

Wind Speed (mph)	Wind Effects
25-31	Large branches will be in motion
32-38	Whole trees will be in motion; inconvenience walking against wind
39-54	Twigs and small branches may break off trees; wind generally impedes progress when walking; high profile vehicles such as trucks and motor homes may be difficult to control
55-74	Potential damage to TV antennas; may push over shallow rooted trees especially if the soil is saturated
75-95	Potential for minimal structural damage, particularly to unanchored mobile homes; power lines, signs and tree branches may be blown down
96-110	Moderate structural damage to walls , roofs, and windows; large signs and tree branches may be destroyed
111-130	Extensive structural damage to walls, roofs and windows; trees blown down; mobile homes may be destroyed
131-155	Extreme damage to structures and roofs; trees uprooted or snapped

Wind Speed (mph)	Wind Effects
Greater than 155	Catastrophic damage; structures destroyed

Source: Washington County Office of Consolidated Emergency Management

Between 1858 and 2011, Massachusetts has experienced approximately 32 tropical storms, ten Category 1 hurricanes, five Category 2 hurricanes and one Category 3 hurricane. This equates to a frequency of once every six years. A hurricane or storm track is the line that delineates the path of the eye of a hurricane or tropical storm.

Hurricanes

A Category One Hurricane passed through Lynn in 1944 as well as a tropical storm in 1923. A hurricane or tropical storm track is the line that delineates the path of the eye of the hurricane or storm. The City also feels the impacts of the wind and rain of other coastal storms and hurricanes, regardless of whether the track passes through the City. Falling trees are a big problem because they can cause power outages when they fall on power lines or block traffic. Information on hurricanes is shown on Map 5 in Appendix B. Lynn has begun to recently address hurricane preparedness by identifying densely populated, high risk areas subject to storm surge, developing evacuation route and personal preparedness outreach in multiple languages. The two major mitigation measures in place are adherence to the Massachusetts State Building Code and the City's Comprehensive Emergency Management Plan which addresses hurricane hazards although primarily from a response perspective.

Tornadoes

Tornadoes tend to be quite rare in eastern Massachusetts and there have been no recorded tornadoes in the City of Lynn. There have been no changes since the 2005 NHM Plan to address tornadoes in Lynn beyond maintaining emergency shelter in the event that they were needed.

The City has adopted the Massachusetts State Building Code. The code's provisions are the most cost-effective mitigation measure against tornados given the extremely low probability of occurrence. The City does maintain certified emergency shelters at the Lynn English, Lynn Classical, and Lynn Technical School High Schools if they were needed in case of evacuations due to tornadoes or other emergencies.

If a tornado were to occur in Lynn, damages would be most likely be high due to the prevalence of older construction and the density of development.

Winter Storms

Winter snow storms and extended cold weather are frequent hazards in New England. The impact of heavy snowfall is to impair the flow of vehicles needed for day-to-day commuting, local businesses and public safety response. Lynn has experienced several

record breaking storms since the 1978 storm and has developed training, techniques and practices to efficiently deal with these events.

In Massachusetts, northeast coastal storms known as nor'easters occur 1-2 times per year. Winter storms are a combination hazard because they often involve wind, ice and heavy snow fall. The impact of heavy snowfall is to impair the flow of vehicles needed for day-to-day commuting, local businesses and public safety response. The average annual snowfall for most of the City is 36.1 inches to 48.0 inches.

The most significant winter storm in recent history was the "Blizzard of 1978," which resulted in over 3 feet of snowfall and multiple day closures of roadways, businesses, and schools. Historically, severe winter storms have occurred in the following years:

Blizzard of 1978	February 1978
Blizzard	March 1993
Blizzard	January 1996
Severe Snow Storm	March 2001
Severe Snow Storm	December 2003
Severe Snow Storm	January 2005
Severe Snow Storm	April, 2007

More recently, 2008 was a record year for snowfall. By the end of the February 2008, Boston's Logan International Airport broke a new February record for total precipitation. In March 2008, many cities and Citys in Massachusetts exceeded the highest snowfall records. The above-average snowfall that season increased groundwater and surface water levels to a high level, and contributed to flooding experienced in spring 2008.

Because a major feature of winter storms is the tendency for higher tides with associated flooding, the same mitigation measures in place for flooding are all important for mitigating the impacts of winter storms. However, the rapid melting of snow after major storms, combined with rainfall, is more of a common flooding threat. The winter storm wind impact on trees has been addressed in the section on wind-related hazards.

The DPW works to clear roads as requested by emergency service providers and carries on general snow removal operations. The MA Department of Transportation removes snow from State Highways 107 and 129, as well as parts of State Route 1A. Since 2005, the City has also reduced its use of sand, opting for 100% salt, which reduces the sand which must be swept from the streets once winter has passed.

The City continues to ban on-street parking at nights during snow storm events and during snow removal to ensure that streets can be plowed and public safety vehicle access is maximized.

Information on winter storm related hazards can be found on Map 6 in Appendix B.

Fire Related Hazards

The City responds to approximately eight to ten brush fires annually and considers brush fires to be a significant hazard. Outdoor burning is not allowed. The City listed the following areas of concern for fire related hazards:

- Lynn Woods Reservation
- Spring Pond Woods
- Cedar Brook Road Area
- King's Lynn Woods

Mapped areas of brush fire concern can be found in Appendix B.

While no loss of life has been recorded in fighting brush fires, several of the fires have spread into occupied buildings and caused firefighter injury. Most of the fires are seen to be caused by carelessness. There is wide access to wooded areas in Lynn from the neighboring communities of Saugus and Lynnfield and the City sees brush fires as a regional natural hazard issue. Brush fires are responded to as a regular fire by the Lynn Fire Department but the Fire Department would like to add some additional equipment to help with fire safety and rescue in forest fire situations.

The 2005 Hazard Mitigation Plan listed the Lynn Woods Reservation as its primary area of concern and the community felt that it had adequate equipment to address the problem. Education on fire risk for those using wooded areas was felt to be critical in reducing the number of brush fires in Lynn.

Geologic Hazards

Earthquakes

Earthquakes are a hazard with multiple impacts beyond the obvious building collapse. Buildings may suffer structural damage which may or may not be readily apparent. Earthquakes can cause major damage to roadways, making emergency response difficult. Water lines and gas lines can break, causing flooding and fires. Another potential vulnerability is equipment within structures. For example, a hospital may be structurally engineered to withstand an earthquake, but if the equipment inside the building is not properly secured, the operations at the hospital could be severely impacted during an earthquake. Earthquakes can also trigger landslides.

According to the State Hazard Mitigation Plan, New England experiences an average of five earthquakes per year. From 1627 to 1989, 316 earthquakes were recorded in Massachusetts. Most have originated from the La Malbaie fault in Quebec or from the Cape Anne fault located off the coast of Rockport. The region has experienced larger earthquakes, of magnitude 6.0 to 6.5 in 1727 and 1755. Other notable earthquakes

occurred here in 1638 and 1663 (Tufts University). Information on earthquakes is included on Map 4 in Appendix B.

The City has many un-reinforced, older masonry buildings which would be vulnerable in a severe earthquake.

The City enforces the MA State Building Code which is adequate in ensuring that new construction meets seismic standards. The Lynn Fire Department also has two mobile, 5 kW generators and the Lynn Water and Sewer Commission has one mobile generator for pump station backup.

There have been no significant mitigation measures to address earthquake hazards since the 2005 NHM Plan, primarily because of the lower historical risk of a serious earthquake within the eastern MA region and because most mitigation resources are directed to flooding and coastal storm related issues. There have been no comments from the community regarding earthquakes.

Landslides

Landslides can result from human activities that destabilize an area or can occur as a secondary impact from another natural hazard such as flooding. In addition to structural damage to buildings and the blockage of transportation corridors, landslides can lead to sedimentation of water bodies.

Most of the City has been classified as having a low susceptibility for landslides, except for a western portion of the City which is classified as having a moderate susceptibility but with low incidence. Plan participant did not indicate that landslides pose a significant risk to Lynn and did not take actions regarding this hazard in the 2005 Plan.

Land Use and Development Trends

Existing Land Use

The most recent land use statistics available from the state are from aerial photography done in 2005. Table 10 below shows the acreage and percentage of land in 33 categories. If the five residential categories are aggregated, residential uses make up 41.87 % of the area of the City (XX acres). The highest percentage use is Forest which comprises 22.32 % with 1649.9 acres.

Table 10
2005 Land Use

Land Type	Acres	Percent
Cropland	3.12	0.04
Pasture	0	0
Forest	1649.9	22.32
Wetland	48.79	0.66
Mining	0	0
Open Land	103.79	1.4
Participation Recreation	150.24	2.03
Spectator Recreation	14.72	0.2
Water-based Recreation	6.86	0.09
Multifamily Residential	1483.07	20.07
High Density Residential	1204.93	16.3
Medium Density Residential	376.28	5.09
Low Density Residential	29.34	0.4
Very Low Density Residential	1.00	0.01
Saltwater Wetland	26.11	0.35
Commercial	482.92	6.53
Industrial	482.43	6.53
Urban Open	8.24	0.11
Transportation	45.17	0.61
Waste Disposal	14.08	0.19
Water	470.65	6.37
Cranberry Bog	0	0
Power line	19.94	0.27
Saltwater Beach	38.93	0.53
Golf Course	76.67	1.04
Marina	13.33	0.18
Urban Public	298.83	4.04
Cemetery	201.48	2.73
Orchard	0	0
Nursery	3.73	0.05
Forested Wetland	117.52	1.59
Junkyards	18.36	0.25
Brush land/Succession	0	0
TOTAL	7,390.43	100

For more information on how the land use statistics were developed and the definitions of the categories, please go to http://www.mass.gov/mgis/lus.htm.

Regional Context, Natural Resources and Development

According to the United States Census Bureau, the city has a total area of 13.5 square miles (35 km^2), of which 10.8 square miles (28 km^2) of it is land and 2.7 square miles (7.0 km^2) of it (19.87%) is water. Lynn is located beside Massachusetts Bay and the Atlantic Ocean. Lynn's shoreline is divided in half by the town of Nahant, which divides Lynn Harbor to the south from Nahant Bay to the north. The city lies north of the Saugus River, and is also home to several brooks, as well as several ponds, the largest being Breed's Pond and Walden Pond (which has no relation to a similarly named pond in Concord). More than a quarter of the town's land is covered by the Lynn Woods Reservation, which takes up much of the land in the northwestern part of the city. The city is also home to two beaches, Lynn Beach and King's Beach, both of which lie along Nahant Bay, as well as a boat ramp in Lynn Harbor.

Lynn is located in the southern part of Essex County, and is five miles (8 km) southwest of Salem, ten miles (16 km) northeast of Boston, and twenty-two miles west-southwest of Cape Ann. The city is bordered by Nahant to the south, Swampscott to the east, Salem to the northeast, Peabody to the north, Lynnfield to the northwest, Saugus to the west, and Revere (in Suffolk County) to the southeast. Lynn's water rights extend into Nahant Bay and share Lynn Harbor with Nahant. There is no land connection to Revere; the only connection is the General Edwards Bridge across the Saugus River. Besides its downtown district, Lynn is also divided into East Lynn and West Lynn, which are further divided into even smaller areas.

Lynn is loosely segmented into the following neighborhoods:

Central:

- Downtown / Business District
- Central Square

West Lynn:

- Pine Hill
- McDonough Sq./ Barry Park
- Tower Hill / Austin Sq. - Saugus River
- The Brickyard
- The Commons
- Walnut St./Lynnhurst
- Veteran's Village

East Lynn:

- Diamond District / Lynn Shore
- Wyoma Sq.
- The Highlands
- The Fay Estates
- Ward 1 / Lynnfield St.
- Goldfish Pond
- The Meadow / Keaney Park (Source: Wikipedia)

The City of Lynn was founded in 1629 as a farming community and maintained its rural character for almost two hundred years until the growth of the shoe manufacturing industry in the 19th century. Lynn was also the birthplace of the Thompson-Houston Electric Company, which would become the General Electric Company. Ad industry grew, housing filled in around the arable land being worked by farmers and the City's several rocky hills. Today the City is one of the most densely populated communities on the North Shore with over 3,500 people per square mile. The two highest density residential areas are in East Lynn next to the central business district and Lynn Commons.

In West Lynn, the northern section is characterized by lower population densities with more single family homes located near the water reservoirs and open space areas including Lynn Woods, Breed Park and Barry Playground. The southern section of West Lynn is more multi-family residential and is located near primary transportation routes including Routes 107 and 1A. The Lynn Waterfront, portions of which are slated for re-development under the new Waterfront Master Plan, is primarily industrial and commercial in nature, with most of the harbor shoreline heavily bulk-headed and listed a state Designated Port Area, designed to protect against the loss of coastal port access for marine and commercial uses. (Source: Lynn Open Space and Recreation Plan, 2005)

Along with waterfront redevelopment, the City has made several rezoning moves to encourage the redevelopment of the central business area downtown, including reducing parking requirements for residential development.

The Metropolitan Area Planning Council (MAPC) has published two sets of population, housing unit, and employment projections as part of the MetroFuture regional planning process. These projections were created for the 101 cities and towns within the MAPC region, as well as 63 additional communities in eastern Massachusetts.

The "Current Trends" projection estimates the number of people, housing units, and jobs likely to exist in each municipality if current patterns of growth and development continued to 2030.The "MetroFuture" projection estimates the number of people and jobs for each of the 164 communities if the recommendations contained in the MetroFuture plan are followed. MetroFuture envisions great changes in the region's development

patterns: under MetroFuture, more growth is directed to areas that are already developed, such as town centers and urban areas, and as a result, less open space will be developed and local business districts will be revitalized.

Projections indicate that Lynn would gain population and jobs if the MetroFuture pattern is adopted, as the City is beginning to do with the redevelopment of its central business district and downtown. The City is projected to gain less in population and suffer a decline in total employment if current patterns of development are followed, as is shown in the following table.

	2020	**2030**
Lynn Current Trends Projection-population	94,277	95,931
Lynn MetroFuture Projection-population	99,243	102,265
Lynn Current Trends Projection-total jobs	25,116	24,979
Lynn MetroFuture Projection-total jobs	26,463	26,752

Recent and Potential Future Development

MAPC consulted with City staff to determine areas that have been or are likely to be developed in the future, defined for the purposes of this plan as a five year time horizon. These areas are shown on Map 2, "Potential Development" and are described below. The letter for each site corresponds to the letters on Map 2.

A) Grandview Place: subdivision-complete

B) End Ridge Estates: subdivision-complete

C) Kent Road: subdivision-complete

D) Apple Hills One and Two: subdivision-complete

E) Boulder Heights: subdivision-complete

F) Fox Run Estates: subdivision-complete

G) South Harbor: hotel/retail and condominiums: waterfront redevelopment of the industrial waterfront area that will include a 600 Kw wind turbine to power the waste water treatment plant- conceptual stage

H) Beacon Property: mixed use commercial and residential redevelopment area-conceptual

I) Lynn Housing Authority property: redevelop for mixed use commercial and residential-conceptual

J) Brookline Acres: apartment complex-currently vacant

Regional Development Issue: Lowe's/Wal-Mart development on Highland Avenue in Salem: drainage and traffic impacts in Lynn. This development is currently being adjudicated.

Recent and Future Development in Hazard Areas

Table 11 shows the relationship of these parcels to two of the mapped hazards. This information is provided so that planners can ensure that development proposals comply with flood plain zoning and that careful attention is paid to drainage issues.

Table 11: Relationship of Potential Development to Hazard Areas

ID	Parcel	Landslide risk	Flood Zone
A	Grandview Place: subdivision	Low	No
B	End Ridge Estates	Low	5.4274% in 0.2% Annual Chance
C	Kent Road	Low	No
D	Apple Hills One and Two	Low	No
E	Boulder Heights	Low	No
F	Fox Run Estates	Low	No
G	South Harbor	Moderate	22.9081% in AE 17.9401% in AO 29.046% in VE
H	Beacon Property	Low	33.211% in 0.2% Annual Chance 52.8286% in AE 0.9421% in VE
I	Lynn Housing Authority property	Low	No

Critical Infrastructure in Hazard Areas

Critical infrastructure includes facilities that are important for disaster response and evacuation (such as emergency operations centers, fire stations, water pump stations, etc.) and facilities where additional assistance might be needed during an emergency (such as nursing homes, elderly housing, day care centers, etc.). These facilities are listed in Table 10 and are shown on all of the maps in Appendix B.

The purpose of mapping the natural hazards and critical infrastructure is to present an overview of hazards in the community and how they relate to critical infrastructure, to better understand which facilities may be vulnerable to particular natural hazards.

Explanation of Columns in Table 12

Column 1: ID #: The first column in Table 8 is an ID number which appears on the maps that are part of this plan. See Appendix B.

Column 2: Name: The second column is the name of the site. If no name appears in this column, this information was not provided to MAPC by the community.

Column 3: Type: The third column indicates what type of site it is.

Column 4: Landslide Risk: The fourth column indicates the degree of landslide risk for that site. This information came from NESEC. The landslide information shows areas with either a low susceptibility or a moderate susceptibility to landslides based on mapping of geological formations. This mapping is highly general in nature. For more information on how landslide susceptibility was mapped, refer to http://pubs.usgs.gov/pp/p1183/pp1183.html.

Column 5: FEMA Flood Zone: The fifth column addresses the risk of flooding. A "No" entry in this column means that the site is not within any of the mapped risk zones on the Flood Insurance Rate Maps (FIRM maps). If there is an entry in this column, it indicates the type of flood zone as follows:

Column 6: Locally-Identified Flood Area: The locally identified areas of flooding were identified by City staff as areas where flooding occurs. These areas do not necessarily coincide with the flood zones from the FIRM maps. They may be areas that flood due to inadequate drainage systems or other local conditions rather than location within a flood zone. The numbers correspond to the numbers on Map 8, "Hazard Areas".

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
1	Lynn Armory	Armory	Low	No	No	Low	0
2	Briarcliff Lodge	Adult Day Care	Low	No	No	Low	0
3	Ocean Shores	Large Residential Facility	Low	AE	No	Low	3
4	Silsbee Tower	Large Residential Facility	Low	No	No	Low	0
5	Olympia Square Apartments	Large Residential Facility	Low	No	No	Low	0
6	St. Stephens Tower	Large Residential Facility	Low	No	No	Low	0
7	Kings Beach Tower	Large Residential Facility	Low	No	No	Low	0
8	Stadium Condominiums	Large Residential Facility	Low	No	No	Low	0
9	300 Lynnshore Drive	Large Residential Facility	Low	No	No	Low	0
10	Seaport Landing	Large Residential Facility	Low	AO	No	Low	4
11	295 Lynnshore Drive	Large Residential Facility	Low	No	No	Low	0
12	Neptune Towers	Large Residential Facility	Low	No	No	Low	2
13	Neptune Towers	Large Residential Facility	Low	No	No	Low	0
14	Rolfe House	Large Residential Facility	Low	No	No	Low	0
15	Harbor Loft 2	Large Residential Facility	Low	No	No	Low	3
16	The Breakers	Large Residential	Low	No	No	Low	0

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
		Facility					
17	Harbor Loft 1	Large Residential Facility	Low	No	No	Low	0
18	Leisure Tower	Large Residential Facility	Low	No	No	Low	0
19	North Shore Community College	School	Low	No	No	Low	0
20	St George's Church	Place of Worship	Low	No	No	Low	0
21	Lynn Woods Reservation	Water Resource	Low	No	No	Low	0
22	GAR Hall And Museum	Cultural Resource	Low	No	No	Low	0
23	Lynn Historical Society	Cultural Resource	Low	No	No	Low	0
24	Newall, Lucian House	Cultural Resource	Low	No	No	Low	0
25	High Rock Tower	Cultural Resource	Low	No	No	Low	0
26	Lovejoy, Charles House	Cultural Resource	Low	No	No	Low	0
27	Bank Block	Cultural Resource	Low	No	No	Low	0
28	St Stephen's Church	Place of Worship	Low	No	No	Low	0
29	Central Building	Place of Assembly	Low	No	No	Low	0
30	Lynn Housing	Municipal Facility	Low	No	No	Low	0

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
	Authority - Community Center						
31	Masonic Hall	Place of Assembly	Low	No	No	Low	0
32	Odd Fellows Hall	Place of Assembly	Low	No	No	Low	0
33	Mary Baker Eddy Historical Home	Cultural Resource	Low	No	No	Low	0
34	Communications Tower - Wayne Alarm	Telecommunications	Low	No	No	Low	0
35	Lynn Head Start Daycare, First Lutheran	Child Care	Low	No	No	Low	0
36	DPW Fueling Station	Municipal Facility	Moderate	No	No	Low	2
37	Project Cope Drug Rehab.	Medical Facility	Low	No	No	Low	0
38	North Shore Medical Center	Housing Authority Residences	Low	No	No	Low	0
39	Meadow Court - Housing Authority	Housing Authority Residences	Low	No	Magnolia Ave	Low	0
40	Tilton Place - Housing Authority	Housing Authority Residences	Low	No	No	Low	0

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
41	Woodman Street - Housing Authority	Housing Authority Residences	Moderate	No	No	Low	0
42	Olive Street - Housing Authority	Housing Authority Residences	Low	No	No	Low	0
43	Green Street - Housing Authority	Housing Authority Residences	Low	No	No	Low	0
44	Bond Street - Housing Authority	Housing Authority Residences	Low	No	No	Low	0
45	South Common Street - Housing Authority	Housing Authority Residences	Low	No	No	Low	0
46	Tremont Street - Housing Authority	Housing Authority Residences	Low	No	No	Low	0
47	Essex Street - Housing Authority	Housing Authority Residences	Low	No	No	Low	0
48	Fabens Building	Large Residential Facility	Low	No	No	Low	0
49	St. Mary's Plaza	Large Residential Facility	Low	No	No	Low	0
50	Lynn City Hall	Municipal Office	Low	No	No	Low	0
51	Curwin Circle -	Housing Authority	Moderate	No	No	Low	0

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
	Housing Authority	Residences					
52	Emergency Management	Municipal Facility	Low	No	No	Low	0
53	Solimine Funeral Home	Mortuary	Low	No	No	Low	0
54	Fire Station Engine 11	Fire Station	Low	No	No	Low	0
55	Fire Station Engine 10	Fire Station	Low	No	No	Low	0
56	Fire Station Engine 7	Fire Station	Low	No	No	Low	0
57	Fire Station Engine 5	Fire Station	Low	No	No	Low	0
58	Fire Station Engine 5	Fire Station	Low	No	No	Low	0
59	Fire Station Engine 9	Fire Station	Moderate	No	No	Low	0
60	Fire Station Engine 1	Fire Station	Low	No	No	Low	0
61	Fire Station Engine 3 / Fire Headquarters	Fire Station	Low	No	No	Low	0
62	Gannon Golf Course Fueling Station	Hazardous Materials	Low	No	No	Low	0
63	Kings Lynn	Large Residential	Moderate	No	No	Low	0

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
		Facility					
64	Lynn Water Treatment Plant	Hazardous Materials	Low	No	No	Low	0
65	C.L. Hathaway	Hazardous Materials	Moderate	AE	No	Low	2
66	All Welding Supplies Inc	Hazardous Materials	Low	No	No	Low	2
67	Garelick Farms - Lynn	Hazardous Materials	Moderate	No	No	Low	2
68	Old Neighborhood Foods	Hazardous Materials	Moderate	No	No	Low	4
69	National Grid Gas	Hazardous Materials	Low	AE	No	Low	2
70	National Grid 8 Substations	Hazardous Materials	Low	No	No	Low	0
71	General Electric Aircraft Engines	Hazardous Materials	Moderate	No	No	Low	2
72	Multi-service Center	Social Services	Low	No	No	Low	0
73	Lynn Public Library	Library	Low	No	No	Low	0
74	Bay Ridge Hospital	Medical Facility	Low	No	No	Low	0
75	DCR Skating Rink	Mortuary	Low	No	No	Low	2
76	Parker Memorial	Mortuary	Low	No	No	Low	0
77	Solimine	Mortuary	Low	No	No	Low	0

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
	Funeral Home						
78	Cuffe-McGinn Funeral	Mortuary	Low	No	No	Low	0
79	Goodrich Funeral Home	Mortuary	Low	No	No	Low	0
80	Lynn District Court	Municipal Office	Low	No	No	Low	0
81	Phillips Manor	Medical Facility	Low	No	No	Low	0
82	Atlantic Rest Home	Special Needs	Low	No	No	Low	0
83	Lynn Shore Rest Home	Nursing home	Low	No	No	Low	0
84	Abbott House	Nursing Home	Low	No	No	Low	0
85	Lynn Home For Elderly Persons	Elderly Housing	Low	No	No	Low	0
86	Lifecare	Medical Facility	Low	No	No	Low	0
87	Manning Field	Recreation	Low	No	No	Low	0
88	Lynn Police Headquarters	Police Station	Low	No	No	Low	0
89	United States Postal Service	Hazardous Materials	Low	No	No	Low	0
90	Fraser Field	Recreation	Low	No	No	Low	0
91	Barry Park	Recreation	Moderate	No	No	Low	4
92	Salvation Army	Armory	Low	No	No	Low	0
93	Fecteau-Leary Middle School	School	Low	No	No	Low	0

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
94	Connery School Annex	School - Special Needs	Low	No	No	Low	0
95	LVTI Annex/ School Dept Headquarters	Municipal Office	Low	No	No	Low	0
96	Connery School	School - Special Needs	Low	No	No	Low	0
97	Lynn Woods School	School - Special Needs	Low	No	No	Low	0
98	Sacred Heart Elementary School	School	Moderate	No	No	Low	4
99	Catholic Charities Child Care	Child Care	Low	No	No	Low	0
100	Lynn Head Start (Temple)	Child Care / Place of Worship	Low	No	No	Low	0
101	Ford Annex	Special Needs	Moderate	No	No	Low	2
102	Lynn School Dept Office	Municipal Facility	Low	No	No	Low	0
103	St Mary Regional Jr/Sr High School	School	Low	No	No	Low	0
104	Ford School	School - Special Needs	Low	No	No	Low	0
105	Washington Community	School	Low	No	No	Low	0

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
	Elementary School						
106	A Drewicz Elementary School	School	Moderate	No	No	Low	0
107	E J Harrington Elementary School	School	Low	No	No	Low	0
108	Cobbet Elementary School	School	Low	No	No	Low	0
109	Brickett Elementary School	School	Low	No	No	Low	0
110	Catholic Charities Second Chance School	School	Low	No	No	Low	0
111	Community Partnership Program	Child Care	Low	No	No	Low	0
112	Greater Bethlehem Temple	Place of Worship	Low	No	No	Low	0
113	Joi Day Care	Child Care	Low	No	No	Low	0
114	Lincoln-Thomson Elementary	School	Moderate	No	No	Low	0

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
	School						
115	Classical High School	School	Moderate	No	No	Low	0
116	Julia F Callahan Elementary School	School	Moderate	No	No	Low	0
117	William R Fallon Elementary School (vacant)	Municipal Facility	Low	No	No	Low	0
118	Tracy Elementary School	School	Low	No	No	Low	0
119	Breed Middle School	School	Moderate	0.2 PCT ANNUAL CHANCE FLOOD HAZARD	No	Low	0
120	Sewell-Anderson Elementary School	School	Low	No	No	Low	0
121	Thurgood Marshall Middle School	School	Low	No	No	Low	0
122	Ingalls Elementary	School	Low	No	No	Low	0

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
	School						
123	Lynn English High School	School	Low	No	No	Low	0
124	Hood Elementary School	School	Low	No	No	Low	0
125	Aborn Elementary School	School	Low	No	No	Low	0
126	St Pius V Elementary	School	Low	No	No	Low	0
127	Pickering Middle School	School	Low	No	No	Low	0
128	Edward A Sisson	School	Low	No	No	Low	0
129	Lynn Vocational Technical High School	School	Low	No	No	Low	0
130	North Shore Christian Elementary School	School	Low	No	No	Low	0
131	Capt William G Shoemaker Elementary School	School	Low	No	No	Low	0
132	Zion Baptist	Place of Worship	Low	No	No	Low	0

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
	Church						
133	YMCA Childcare	Child Care	Low	No	No	Low	0
134	Hollis Road Sewer Lift Station	Sewer Pumping Station	Low	No	No	Low	0
135	Joel Circle Sewer Lift Station	Sewer Pumping Station	Low	No	No	Low	0
136	Log Cabin Road Sewer Lift Station	Sewer Pumping Station	Low	No	No	Low	0
137	Transfaglia Road Sewer Lift Station	Sewer Pumping Station	Moderate	No	No	Low	0
138	Sanderson Ave Sewer Lift Station	Sewer Pumping Station	Low	No	No	Low	0
139	Reed Street Sewer Lift Station	Sewer Pumping Station	Moderate	No	No	Low	2
140	Camden Street Sewer Lift Station	Sewer Pumping Station	Moderate	AE	No	Low	2
141	Washington Street Sewer Lift Station	Sewer Pumping Station	Low	No	No	Low	4

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
142	Hanson Street Pump Sewer Lift Station	Sewer Pumping Station	Moderate	AO	No	Low	2
143	Sewer Lift Station	Sewer Pumping Station	Low	AE	No	Low	2
144	Lakeview Ave Sewer Lift Station	Sewer Pumping Station	Low	No	No	Low	0
145	Bridge No. 6 Substation	Power Substation	Moderate	No	Bridge Street at Boston Street and Strawberry Brook	Low	4
146	Lynn Shore Drive Seawall	Flood Protection	Low	VE	No	Low	0
147	Transfaglia Road Stormwater Lift Station	Sewer Pumping Station	Moderate	No	No	Low	0
148	Linton Road Stormwater Lift Station	Sewer Pumping Station	Low	No	No	Low	0
149	Lynn Traffic Control Point	Traffic Control Point	Low	No	No	Low	0
150	Lynn Traffic Control Point	Traffic Control Point	Low	No	No	Low	0
151	Lynn Traffic Control Point	Traffic Control Point	Low	No	No	Low	0
152	Lynn Traffic	Traffic Control	Low	No	No	Low	0

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
	Control Point	Point					
153	Lynn Traffic Control Point	Traffic Control Point	Low	No	No	Low	0
154	Lynn Traffic Control Point	Traffic Control Point	Low	No	No	Low	0
155	Lynn Traffic Control Point	Traffic Control Point	Low	No	No	Low	2
156	Lynn Traffic Control Point	Traffic Control Point	Moderate	No	No	Low	0
157	Lynn Traffic Control Point	Traffic Control Point	Low	No	No	Low	0
158	Fire Alarm Dispatch Center	Telecommunications	Low	No	No	Low	0
159	Verizon Telephone	Communications	Low	No	No	Low	0
160	Hyberia	Telecommunications	Low	No	No	Low	0
161	Railroad	Transportation Facility	Low	No	Alley Street	Low	0
162	MBTA Bus Terminal	Transportation Facility	Moderate	No	No	Low	2
163	Commuter Rail Station	Transportation Facility	Low	No	No	Low	4
164	Tennessee Gas Pipeline	Gas Line	Moderate	No	No	Low	0
165	330 Scangas Nominee Trust	Hazardous Materials	Low	AE	No	Low	2
166	Lynn Waste	Sewer Treatment	Moderate	No	No	Low	3

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
	Water Treatment Plant	Facility					
167	First Lutheran Church	Place of Worship	Low	No	No	Low	0
168	Grace United Methodist Church of Lynn	Place of Worship	Low	No	No	Low	0
169	Austin Square Baptist Church	Place of Worship	Moderate	No	No	Low	0
170	Bethlehem Temple	Place of Worship	Low	No	No	Low	0
171	St Mary's Church	Place of Worship	Low	No	No	Low	0
172	Washington Street Baptist Church	Place of Worship	Low	No	No	Low	0
173	St Josephs Church	Place of Worship	Low	No	No	Low	0
174	Christ Church United Methodist	Place of Worship	Low	No	No	Low	0
175	Sacred Heart Church	Place of Worship	Moderate	No	No	Low	4
176	Walgreens	Pharmacy	Moderate	No	No	Low	0
177	Walgreens	Pharmacy	Low	No	No	Low	0
178	Walgreens	Pharmacy	Low	No	No	Low	0
179	CVS	Pharmacy	Low	No	No	Low	0

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
180	CVS	Pharmacy	Low	0.2 PCT ANNUAL CHANCE FLOOD HAZARD	No	Low	0
181	Stop & Shop	Grocery Store/ Pharmacy	Low	No	No	Low	0
182	Johnny's Food Master	Grocery Store	Low	0.2 PCT ANNUAL CHANCE FLOOD HAZARD	No	Low	0
183	Shaw's Super Market	Grocery Store/ Pharmacy	Low	No	No	Low	0
184	Mary Ellen Drive Water Tank	Water Storage Tank	Low	No	No	Low	0
185	Pinehill Water Tank	Water Storage Tank	Low	No	No	Low	0
186	Seaport Landing Marina	Recreation/ Residences	No	VE	No	High	0
187	Lynn Yacht Club	Recreation	Low	AE	No	Low	1
188	Volunteer Yacht Club	Recreation	Low	VE	No	Low	1
189	Lynn EDIC Pier	Recreation	No	VE	No	High	0
190	General	Bridge	No	AE	No	High	0

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
	Edwards Bridge						
191	Dam	Dam	Low	No	No	Low	0
192	Dam /Pump Station	Dam	Low	No	No	Low	0
193	Pine Grove Cemetery Fueling Facility	Hazardous Material	Low	0.2 PCT ANNUAL CHANCE FLOOD HAZARD	No	Low	0
194	National Grid Power Station	Power Station	Low	AE	No	Low	2
195	Fox Hill Bridge	Bridge	No	AE	No	High	0
196	Floating Bridge	Bridge	Low	No	No	Low	0
197	Gear Plant Heliport	Heliport	Moderate	No	No	Low	2
198	EOC	EOC	Low	No	Johnson Street	Low	0
199	Quinn Road Water Tank	Water Tank	Low	No	No	Low	0
200	Dibble Road Water Tank	Water Tank	Low	No	No	Low	0
201	Lynn Water and Sewer Commission Headquarters	Municipal Facility	Low	No	No	Low	0
202	Juvenile Court	Government Facility	Low	No	No	Low	0
203	Holy Family	Place of Worship	Low	No	No	Low	0

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
	Catholic Church						
204	East Baptist Church	Place of Worship	Low	No	No	Low	0
205	Church	Place of Worship	Low	No	No	Low	0
206	Mosque	Place of Worship	Low	No	No	Low	0
207	Haitian Church	Place of Worship	Low	No	No	Low	0
208	Church	Place of Worship	Low	No	Johnson Street	Low	0
209	Church	Place of Worship	Low	No	No	Low	0
210	Church	Place of Worship	Low	No	No	Low	0
211	church	Place of Worship	Low	No	No	Low	0
212	St Theresa House	Low Income Housing	Low	No	No	Low	0
213	Low Service Reservoir	Water Resource	Low	0.2 PCT ANNUAL CHANCE FLOOD HAZARD	No	Low	0
214	Low Service Pumping St	Water Pumping Station	Moderate	No	No	Low	0
215	Saugus River Diversion Dam	Dam	Low	No	No	High	0
216	KIPP Academy Lynn Charter School	School	Low	No	No	Low	0
217	Habit Management	Medical Facility	Moderate	No	No	Low	2

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
	(Methadone) Treatment Center						
218	Elliott Community Health Center	Medical Facility	Low	No	No	Low	0
219	VA Clinic/ Doctors offices	Medical Facility	Low	No	No	Low	0
220	Rite-Aid	Pharmacy	Low	0.2 PCT ANNUAL CHANCE FLOOD HAZARD	No	Low	0
221	Rite-Aid	Pharmacy	Low	No	No	Low	0
222	CVS	Pharmacy	Low	No	No	Low	0
223	Richmond Pharmacy	Pharmacy	Low	No	No	Low	0
224	Eaton Apothecary	Pharmacy	Low	No	No	Low	0
225	Flag Pharmacy	Pharmacy	Low	No	No	Low	0
226	Pharmacy - Market Square	Pharmacy	Low	No	No	Low	0
227	Price Rite of Lynn	Grocery	Low	No	No	Low	2
228	Compare Supermarket	Grocery	Low	No	No	Low	0
229	Lynn	Medical Facilty	Low	No	No	Low	0

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
	Community Health Center						
230	East Lynn Post Office	Government Facility	Low	No	No	Low	0
231	West Lynn Post Office	Government Facility	Moderate	No	No	Low	0
232	Atlantic Ambulance	Medical Services	Low	No	No	Low	0
233	Atlantic Ambulance	Medical Services	Low	No	No	Low	0
234	Atlantic Ambulance	Medical Services	Low	0.2 PCT ANNUAL CHANCE FLOOD HAZARD	No	Low	0
235	Action Ambulance	Medical Services	Low	No	No	Low	0
236	Walden Pond outlet Dam	Dam	Low	No	No	Low	0
237	Birch Pond Dam	Dam	Low	No	No	Low	0
238	Lantern Rock Dike #4	Water Feature	Low	No	No	Low	0
239	Comcast	Communication	Low	0.2 PCT ANNUAL CHANCE FLOOD HAZARD	No	Low	0

Table 12: Relationship of Critical Infrastructure to Hazard Areas							
ID	**NAME**	**TYPE**	**Landslide Risk**	**Within FEMA Flood Zone**	**Within Locally Identified Area of Flooding**	**Average Annual Snow Fall**	**Hurricane Surge Areas (Category #)**
240	Lynn Community Cable	Communication	Moderate	No	No	Low	4
241	Knight of Columbus	Place of Assembly	Low	No	No	Low	0
242	Knights of Pythias	Place of Assembly	Low	No	No	Low	0
243	Community Brotherhood	Place of Assembly	Low	No	No	Low	0
244	St Michaels House	Place of Assembly	Moderate	No	Lower Western Interceptor Sewer/Drain Line	Low	2
245	Franco American	Place of Assembly	Low	No	No	Low	0
246	Connery-Post 6	Place of Assembly	Low	No	No	Low	0
247	North Shore Animal Hospital	Medical Facility	Low	No	No	Low	0

Vulnerability Assessment

The purpose of the vulnerability assessment is to estimate the extent of potential damages from natural hazards of varying types and intensities. A vulnerability assessment and estimation of damages was performed for hurricanes, earthquakes, and flooding. The methodology used for hurricanes and earthquakes was the HAZUS-MH software. The methodology for flooding was developed specifically to address the issue in many of the communities where flooding was not solely related to location within a floodplain.

Introduction to HAZUS-MH

HAZUS- MH (multiple-hazards) is a computer program developed by FEMA to estimate losses due to a variety of natural hazards. The following overview of HAZUS-MH is taken from the FEMA website. For more information on the HAZUS-MH software, go to http://www.fema.gov/plan/prevent/hazus/index.shtm

> "HAZUS-MH is a nationally applicable standardized methodology and software program that contains models for estimating potential losses from earthquakes, floods, and hurricane winds. HAZUS-MH was developed by the Federal Emergency Management Agency (FEMA) under contract with the National Institute of Building Sciences (NIBS). Loss estimates produced by HAZUS-MH are based on current scientific and engineering knowledge of the effects of hurricane winds, floods and earthquakes. Estimating losses is essential to decision-making at all levels of government, providing a basis for developing and evaluating mitigation plans and policies as well as emergency preparedness, response and recovery planning.
>
> HAZUS-MH uses state-of-the-art geographic information system (GIS) software to map and display hazard data and the results of damage and economic loss estimates for buildings and infrastructure. It also allows users to estimate the impacts of hurricane winds, floods and earthquakes on populations."

There are three modules included with the HAZUS-MH software: hurricane wind, flooding, and earthquakes. There are also three levels at which HAZUS-MH can be run. Level 1 uses national baseline data and is the quickest way to begin the risk assessment process. The analysis that follows was completed using Level 1 data.

Level 1 relies upon default data on building types, utilities, transportation, etc. from national databases as well as census data. While the databases include a wealth of information on the City of Scituate, it does not capture all relevant information. In fact, the HAZUS training manual notes that the default data is "subject to a great deal of uncertainty."

However, for the purposes of this plan, the analysis is useful. This plan is attempting to only generally indicate the possible extent of damages due to certain types of natural

disasters and to allow for a comparison between different types of disasters. Therefore, this analysis should be considered to be a starting point for understanding potential damages from the hazards. If interested, communities can build a more accurate database and further test disaster scenarios.

Estimated Damages from Hurricanes

The HAZUS software was used to model potential damages to the community from a 100 year and 500 year hurricane event; storms that are .01% and .005% likely to happen in a given year and roughly equivalent to a Category 2 and Category 4 hurricane. The damages caused by these hypothetical storms were modeled as if the storm track passed directly through the City, bringing the strongest winds and greatest damage potential.

Though there are no recorded instances of a hurricane equivalent to a 500 year storm passing through Massachusetts, this model was included in order to present a reasonable "worst case scenario" that would help planners and emergency personnel evaluate the impacts of storms that might be more likely in the future, as we enter into a period of more intense and frequent storms.

Table 13
Estimated Damages from Hurricanes

	100-year	**500-year**
Building Characteristics		
Estimated total number of buildings	18,124	18,124
Estimated total building replacement value (Year 2002 $) (Millions of Dollars)	$5,481	$5,481
Building Damages		
# of buildings sustaining minor damage	1,847	6,244
# of buildings sustaining moderate damage	308	2,746
# of buildings sustaining severe damage	14	404
# of buildings destroyed	2	213
Population Needs		
# of households displaced	207	1,724
# of people seeking public shelter	63	504
Debris		
Building debris generated (tons)	12,920.4	61,464.48
Tree debris generated (tons)	4,539.6	18,359.52
# of truckloads to clear building debris	516	2,472
Value of Damages (Thousands of dollars)		
Total property damage	$62,187.10	$421,226.60

Table 13
Estimated Damages from Hurricanes

Total losses due to business interruption	$8,695.37	$64,891.20

Estimated Damages from Earthquakes

Methodology Used

The HAZUS earthquake module allows users to define an earthquake magnitude and model the potential damages caused by that earthquake as if its epicenter had been at the geographic center of the study area. For the purposes of this plan, two earthquakes were selected: magnitude 5.0 and a magnitude 7.0. Historically, major earthquakes are rare in New England, though a magnitude 5 event occurred in 1963.

Table 14
Estimated Damages from Earthquakes

	Magnitude 5.0	**Magnitude 7.0**
Building Characteristics		
Estimated total number of buildings	18,000	18,000
Estimated total building replacement value (Year 2002 $) (Millions of dollars)	$5,481	$5,481
Building Damages		
# of buildings sustaining slight damage	2,970	2,220
# of buildings sustaining moderate damage	929	6,437
# of buildings sustaining extensive damage	142	5,081
# of buildings completely damaged	18	4,021
Population Needs		
# of households displaced	335	14,460
# of people seeking public shelter	96	4,117
Debris		
Building debris generated (tons)	0	1.00 million
Value of Damages (Millions of dollars)		
Total property damage	$279.95	$3,554.30
Total losses due to business interruption	$16.97	$443.43

Estimated Damages from Flooding

Methodology Used

MAPC did not use HAZUS-MH to estimate flood damages in Lynn. In addition to technical difficulties with the software, the riverine module is not a reliable indicator of flooding in areas where inadequate drainage systems contribute to flooding even when those structures are not within a mapped flood zone. In lieu of using HAZUS, MAPC developed a methodology to give a rough approximation of flood damages.

Lynn is 10.8 square miles or 6,912 acres. Approximately 128 acres have been identified by local officials as areas of flooding. This amounts to 1.85 % of the land area in Lynn. The number of structures in each flood area was estimated by applying the percentage of the total land area to the number of structures (18,124) in Lynn; the same number of structures used by HAZUS for the hurricane and earthquake calculations. HAZUS uses a value of $302,417 per structure for the building replacement value. This was used to calculate the total building replacement value in each of the flood areas. The calculations were done for a low estimate of 10% building damages and a high estimate of 50% as suggested in the FEMA September 2002 publication, "State and Local Mitigation Planning how-to guides" (Page 4-13). The range of estimates for flood damages is $9,526,136- $47,630,677. These calculations are not based solely on location within the floodplain or a particular type of storm (i.e. 100 year flood).

Table 15- Estimated Damages from Flooding							
ID	**Flood Hazard Area**	**Approximate Area in Acres**	**% of Total Land Area**	**# of Struc-tures**	**Replacement Value**	**Low Damage Estimate**	**High Damage Estimate**
1	Surfside Road	15.2070	0.22	40	$12,096,680	$1,209,668	$6,048,340
2	Valley Road	5.9559	0.0806	15	$4,536,255	$453,626	$2,268,126
3	Lower Western Interceptor Sewer/Drain Line	51.1447	0.6920	125	$37,802,125	$3,782,125	$18,901,062
4	Bridge Street at Boston Street and Strawberry Brook	8.5305	0.1154	21	$6,350,757	$635,076	$3,175,379
5	Flax Pond at Maple Street	10.6996	0.1448	26	$7,862,842	$786,284	$3,931,421
6	Magnolia Ave	7.3823	0.0999	18	$5,443,506	$544,351	$2,721,753
7	Cedar Pond	10.2066	0.1381	25	$7,560,425	$756,043	$3,780,213
8	Bridge Road outlet	6.6202	0.0896	20	$6,048,347	$604,835	$3,024,174
9	Alley Street	8.2300	0.1114	13	$3,931,421	$393,142	$1,965,711
10	Johnson Street	5.2412	0.0709	16	$4,838,672	$483,867	$2,419,336
11	Silsbee Street	3.4257	0.0463	8	$2,419,336	$241,937	$1,209,668
18	Coolidge Road	5.6204	0.0760	14	$4,233,838	$423,384	$2,116,919
	Totals	128.26	1.73543	315	$95,261,355	$9,526,136	$47,630,677

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V. HAZARD MITIGATION GOALS

The Lynn Local Multiple Hazard Community Planning Team met on March 9, 2011. At that meeting, the team reviewed and discussed the goals from the 2005 Hazard Mitigation Plan for the City of Lynn.

The following ten goals were endorsed by the Committee for the 2011 update of the Lynn Hazard Mitigation Plan:

1. Ensure that critical infrastructure sites are protected from natural hazards.

2. Protect existing residential and business areas from flooding.

3. Maintain existing mitigation infrastructure in good condition.

4. Continue to enforce existing zoning and building regulations.

5. Educate the public about zoning and building regulations, particularly with regard to changes in regulations that may affect tear-downs and new construction.

6. Encourage future development in areas that are not prone to natural hazards.

7. Educate the public about natural hazards and mitigation measures.

8. Make efficient use of public funds for hazard mitigation.

9. Protect the City's ability to respond to various natural hazard events.

VI. EXISTING MITIGATION MEASURES

Existing Multi-Hazard Mitigation Measures

Comprehensive Emergency Management Plan (CEMP) – Every community in Massachusetts is required to have a Comprehensive Emergency Management Plan. These plans address mitigation, preparedness, response and recovery from a variety of natural and man-made emergencies. These plans contain important information regarding flooding, hurricanes, tornadoes, dam failures, earthquakes, and winter storms. Therefore, the CEMP is a mitigation measure that is relevant to all of the hazards discussed in this plan.

Communications Equipment – The City has its own Emergency Operations Center located at the Lynn Police facility. The City is installing a Reverse 911 system in 2012.

Emergency Power Generators – Emergency power generators are in place in the three certified emergency shelters- the Lynn Classical High School, Lynn English High School and the Lynn Vocational High School. All but three fire stations have backup emergency generators.

Massachusetts State Building Code – The Massachusetts State Building Code contains many detailed regulations regarding wind loads, earthquake resistant design, flood-proofing, and snow loads.

Southern Essex Regional Emergency Management Planning Committee (REPC) – Lynn is a member of the Southern Essex REPC which also includes the communities of Beverly, Danvers, Essex, Gloucester, Manchester-by-the-Sea, Marblehead, Nahant, Peabody, Rockport, Salem, and Swampscott.

The mission of an LEPC can be summarized as follows:

- A response plan must be written for responding to a hazardous material incident with the jurisdiction(s). It must also be reviewed annually.
- Emergency responders (police, fire, emergency medical services, public works, etc.) must be trained to levels indicated in the plan. At a minimum, first responders must be trained to the awareness level.
- The emergency response plan must be exercised at least once a year.
- The committee must create a system to collect, store, and respond to public requests.

Existing Flood Hazard Mitigation Measures

Overview of Mitigation Measures – Background: The most severe winter storm in recent history, the Great Blizzard of 1978 heavily impacted the Lynn, Revere, and Saugus coastal areas. It damaged 25% of Revere's homes, left 3,000 people homeless, and

flooded over 3,000 buildings in the Lynn, Revere, Saugus and Malden area. The storm's impacts led these communities to request the Army Corps of Engineers to develop and implement the Saugus River and Tributaries Flood Damage Reduction Project, which was completed by 1989. Included in the plans recommendations and since installed, were dikes and a pooling area for Revere Beach, floodgates for the Saugus River (located just south of the entrance to Lynn Harbor), and a series of dikes, walls and revetments along Lynn Harbor.

As demonstrated by the Saugus River Flood Damage Reduction Project, mitigating flood hazards is more than a local issue amongst the densely developed communities of the North Shore, such as Lynn. The drainage systems that serve these communities are a complex system of storm drains, tide gates, roadway drainage structures, pump stations and other facilities owned and operated by a wide array of agencies including the City of Lynn, the Department of Conservation and Recreation (DCR), the Massachusetts Water Resources Authority (MWRA), Massachusetts Highway Department (MHD) and the Massachusetts Bay Transportation Authority (MBTA). The planning, construction, operations and maintenance of these structures are integral to the flood hazard mitigation efforts of communities. These agencies must be considered the communities regional partners in hazard mitigation. These agencies also operate under the same constraints as communities do including budgetary and staffing constraints and numerous competing priorities. In the sections that follow, the plan includes recommendations for activities to be undertaken by these other agencies. Implementation of these recommendations will require that all parties work together to develop solutions.

Combined Sewer Separation: During heavy flows to the treatment plant, the plant is not able to pump as much water which results in wet well flooding in the lower areas of the collection system. There is an on-going sewer separation program and the program has successfully remediated more than half of the City's combined sewer and drain lines, primarily in East Lynn.

National Flood Insurance Program (NFIP) – Lynn participates in the NFIP with 570 policies in force as of the May 31, 2011. FEMA maintains a database on flood insurance policies and claims. This database can be found on the FEMA website at http://www.fema.gov/business/nfip/statistics/pcstat.shtm

The following information is provided for the City of Lynn:

Flood insurance policies in force (as of February 29, 2012)	460
Coverage amount of flood insurance policies	85,298,900
Premiums paid	240,945
Total losses (all losses submitted regardless of the status)	159
Closed losses (Losses that have been paid)	127
Open losses (Losses that have not been paid in full)	1
CWOP losses (Losses that have been closed without payment)	31
Total payments (Total amount paid on losses)	$1,109,700.58

The City complies with the NFIP by enforcing floodplain regulations, maintaining up-to-date floodplain maps, and providing information to property owners and builders regarding floodplains and building requirements.

Since the 2005 plan, the policies in force have increased by 108 and the total losses have increased by 52. The total payments, as of December 21, 2004, were $659,302.66, $450,397.92 less than the most recent figure.

Public Services Operations/Maintenance Activities – The Lynn Water and Sewer Commission actively maintains the City's storm drain system. The following specific activities serve to maintain the capability of the drainage system through the reduction of sediment and litter build up and proper maintenance and repair.

- *Street sweeping* – Street sweeping is done by both Lynn and contracted out, conducted nine times annually, with streets swept twice per year or as needed.

- *Catch basin cleaning* –2,000 catch basins; each basin is cleaned every year with clogged basins cleaned as needed. Lynn has replaced several dysfunctional catch basins with new deep-sump basins over the last 10 years.

- *Roadway treatments* – Calcium Chloride is used for snow/ice treatment.

- *Drainage maintenance*- 60 % of the City's catch basins and drain lines are now digitally mapped. The LWSC tracks and records all catch basin maintenance. The Engineering Department inspects streets and drainage systems once construction is completed. Private covenants for private, off-street drainage facilities are required. Routine maintenance and systematic replacement of drainage infrastructure part of the Lynn Water and Sewer Commission's annual operating budget.

2010 Open Space and Recreation Plan- The Lynn Open Space and Recreation Plan, lists actions that can could help prevent flooding and reduce stormwater runoff through the following targeted actions from 2010 – 2015

- Identify, conserve and utilize open space areas along the Saugus River;
- Begin re-forestation of fire-damaged areas within the Lynn Woods Reservation;
- Continue the revitalization of downtown urban green spaces, such as adding pervious traffic islands and landscaped, pervious parking areas.

Flood Plain Regulations - There are no zoning restrictions related to flooding. For the purposes of flood insurance, property owners must meet Federal guidelines for development in flood zones as defined by the Flood Insurance Rate Maps.

Lynnshore Drive Seawall - Development along Lynnshore Drive is protected by a seawall owned by the State Department of Conservation and Recreation.

Wetland Ordinance- Chapter 16.04 of the Lynn Code of Ordinances: The City follows MGL Chapter 131 Section 40 *MA Wetlands Protection Act,* as well as state wetland regulations.

Dam safety regulations- *Lynn Water and Sewer Commission Dam Safety Report* – The LWSC inspected all of its dams and dikes in 2003 and submitted a report to the DEM Office of Dam Safety. This report identified all rehabilitation work required at each dam. The Walden Pond dams were rehabilitated in 1999-2000 and the Hawkes Pond dams were rehabilitated in 1997-1998. Birch Pond Dam, Breeds Pond Dam at Lantern Rock and Breeds Pond Outlet Dam have all been rehabilitated since 2005

Comprehensive Emergency Management Plan – The CEMP addresses dam safety.

Existing Wind Hazard Mitigation Measures

CEMP – The Lynn Comprehensive Emergency Management Plan contains a section on hurricanes. It lists five generic mitigation measures:

- Develop and disseminate emergency public information and instructions concerning hurricane preparedness and safety.
- Community leaders should ensure that Lynn is enrolled in the National Flood Insurance Program.
- Develop and enforce local building codes to enhance structural resistance to high winds and flooding. Build new construction in areas that are not vulnerable to direct hurricane effects.
- Review National Flood Insurance Rate Maps and Hurricane Evacuation Maps for possible impact on the community.
- Maintain plans for managing all hurricane emergency response activities.

The Lynn CEMP outlines three generic mitigation measures for tornadoes.

- Develop and disseminate emergency public information and instructions concerning tornado safety, especially guidance regarding in-home protection and evacuation procedures, and locations of public shelters.
- Strict adherence should be paid to building code regulations for all new construction.
- Maintain plans for managing tornado response activities. Refer to the non-institutionalized, special needs and transportation resources listed in the Resource Manual.

Massachusetts State Building Code – The City enforces the Massachusetts State Building Code whose provisions are generally adequate to protect against most wind damage. The

code's provisions are the most cost-effective mitigation measure against tornados given the extremely low probability of occurrence. If a tornado were to occur, the potential for severe damages would be extremely high.

Tree-trimming program – The City contracts out some of its work to trim and remove trees as needed and grind stumps. National Grid maintains its power line corridors, and the DPW maintains the rest of the City's trees. 25% of the City's trees have been inventoried but the City would like to complete the inventory.

Additional mitigation measures in place include:

The City has placed zoning height restrictions on the height of wind energy turbines.

Lynn now has backup power generators at key public facilities and utility sites.

The City places power lines underground during new construction to avoid storm damage.

Existing Winter Hazard Mitigation Measures

Snow disposal – Regular plowing and snow/ice removal. Calcium chloride is used primarily for road treatments. Sand is very rarely used as it creates siltation and clean up problems. The DPW works to clear roads as requested or in an emergency for the Fire and Police Departments.

Existing Brush Fire Hazard Mitigation Measures

Burn Permits – The City fire department does not allow outdoor burning.

Fire Response-Lynn responds to a brush fire or marsh fire in the same manner as other fire calls. It does not have a dedicated Forestry Division.

Subdivision/Development Review – The Fire Department participates in the review of new subdivisions and development projects.

Existing Geologic Hazard Mitigation Measures

Massachusetts State Building Code – The City enforces the State Building Code. It contains a section on designing for earthquake loads (780 CMR 1612.0). Section 1612.1 states that the purpose of these provisions is "to minimize the hazard to life to occupants of all buildings and non-building structures, to increase the expected performance of higher occupancy structures as compared to ordinary structures, and to improve the capability of essential facilities to function during and after an earthquake". This section goes on to state that, due to the complexity of seismic design, the criteria presented are the minimum considered to be "prudent and economically justified" for the protection of

life safety. The code also states that absolute safety and prevention of damage, even in an earthquake event with a reasonable probability of occurrence, cannot be achieved economically for most buildings.

Section 1612.2.5 sets up seismic hazard exposure groups and assigns all buildings to one of these groups according to a Table 1612.2.5. Group II includes buildings which have a substantial public hazard due to occupancy or use and Group III are those buildings having essential facilities which are required for post-earthquake recovery, including fire, rescue and police stations, emergency rooms, power-generating facilities, and communications facilities.

In the event of an earthquake and fires caused by it, 100 % of Lynn is served by fire hydrants. The Emergency Management Department has two mobile, 5Kw generators in case of power loss and the Lynn Water and Sewer Commission has one.

Table 16- Lynn Existing Mitigation Measures

Type of Existing Mitigation Measures	Area Covered	Effectiveness/ Enforcement	Improvements/ Changes Needed
MULTIPLE HAZARDS			
Comprehensive Emergency Management Plan (CEMP)	City-wide.	Emphasis is on emergency response.	None. Plan is up to date.
Communications Equipment: • Member of NERAC and NEMWIC • DFS Mobile backup • Police station is emergency operations center	City-wide.	Effective	Complete Reverse 911 installation. Evacuation/intersection sign-boards.
Massachusetts State Building Code	City-wide.	Effective for new construction.	None
Hazardous Facilities Emergency Response Plans	City-wide.	Emergency response.	All plans up to date for Lynn Water Treatment Plant, General Electric, C.L. Hathaway, LWSC Wastewater Treatment Plant, Blossom Street LNG Tank, Garelick Farms
Emergency Power Generators	Lynn English, Lynn Tech, Lynn Classical, DPW, City Hall, six of nine fire stations	Effective.	Upgrade generators as needed; provide generators at additional locations; provide alternative fuel sources and generator power source flexibility. New fixed generator needed at three fire stations and LWSC facility.
Participation in the Southern Essex Emergency Management Planning Committee	City-wide	A forum for cooperation on natural and manmade disasters.	None
FLOOD HAZARDS/DAMS			

Type of Existing Mitigation Measures	Area Covered	Effectiveness/ Enforcement	Improvements/ Changes Needed
LWSC Capital Improvements Program	City-wide	The City has made extensive drainage infrastructure upgrades under its Capital Improvements Program since 2005.	Additional resources are needed to implement further upgrades, particularly for CSO separation work.
Participation in the National Flood Insurance Program (NFIP)	Areas identified on the FIRM maps	There are 460 policies in force.	Encourage all eligible homeowners to obtain insurance; add more public outreach about program availability and new FIRM maps.
Public education on stormwater and flooding		website	Update for wetlands and new FIRM maps when available.
City Engineering Department inspects all streets and drainage systems once construction is completed.	City Wide	Effective	None
Public Services Operations/Maintenance	City-wide	Effective	Complete digital mapping of drainage and sewer system.
2010 Open Space Plan	City Wide	Effective	Target land acquisitions along the Saugus River for flood water storage, damage prevention and habitat protection.
Wetlands Regulation-follows MA Wetlands Protection Act	City-wide	Effective	None
Site Plan Review	City-wide	Somewhat Effective	Consider referencing MA Stormwater Management Standards.
Planned Unit Development	City-wide	Effective	Consider referencing MA Stormwater Management Standards.
Subdivision Rules and Regulations	City-wide	Somewhat Effective.	Consider referencing MA Stormwater

Type of Existing Mitigation Measures	Area Covered	Effectiveness/ Enforcement	Improvements/ Changes Needed
			Management Standards.
Lynn Water and Sewer Commission Dam Safety Report – The LWSC inspected all of its dams and dikes in 2003 and submitted a report to the DEM Office of Dam Safety. This report identified all rehabilitation work required at each dam. Birch Pond Dam, Breeds Pond at Lantern Rock and Breeds Pond Outlet Dam have all been rehabilitated since 2005. The Walden Pond dams were rehabilitated in 1999-2000 and the Hawkes Pond dams were rehabilitated in 1997-1998.	City-wide	Effective	Rehabilitate and upgrade dams as needed. Replace headwall at Foster's Pond Dam.
Comprehensive Emergency Management Plan (CEMP): addresses dam safety	City-wide	Effective	CEMP is up to date: None.
Permits required for construction: state law requires permit for the construction of any dam.	City-wide	Effective	None
WIND HAZARDS			
CEMP	City-wide	Effective	None
The Massachusetts State Building Code	City-wide	Effective for most situations except severe storms.	None
Tree trimming program and power line corridor maintenance.	City-wide	Satisfactory	Complete tree inventory.
Limits wind turbine height	City-wide	Effective	None

Type of Existing Mitigation Measures	Area Covered	Effectiveness/ Enforcement	Improvements/ Changes Needed
Backup generator capacity in place at key public facilities.	City-wide	Effective	Update existing generators as needed and add fixed generator capacity to three fire stations.
Lynn Emergency Planning Website- Hurricane Preparedness	City-wide	Effective	None
WINTER HAZARDS			
Snow Removal	City-wide	Somewhat Effective	None
Lynn Emergency Preparedness Website- Snow and Ice Safety	City-side	Effective	None
BRUSH FIRE HAZARDS			
Outdoor burning is not allowed.	City-wide.	Effective.	Need two All Terrain Vehicles for brush fire access and equipment mobility.
Water availability: 100 % of City is served by hydrants; tanker truck agreements in place with surrounding communities; authority to take water from surface supplies.	City-wide.	Effective.	None.
Development Review	City-wide.	Effective.	None.
Public Education	City-wide	Effective.	None.
GEOLOGIC HAZARDS			
The Massachusetts State Building Code	City-wide.	Effective.	None.
Mobile generators and light pole for power/light backup	City-wide	Effective.	None.

VII. MITIGATION MEASURES FROM THE 2005 PLAN

Review and Update Process

At a meeting of the Lynn Hazard Mitigation Committee, City staff reviewed the potential mitigation measures identified in the 2005 North Shore Regional Pre-Disaster Mitigation Plan Lynn Annex and determined whether each measure had been implemented or deferred. Of those measures that had been deferred, the committee evaluated whether the measure should be deleted or carried forward into the 2012 Lynn Hazard Mitigation Plan. The decision on whether to delete or retain a particular measure was based on the committee's assessment of the continued relevance or effectiveness of the measure and whether the deferral of action on the measure was due to the inability of the City to take action on the measure.

Table 17- Potential Mitigation Measures from the 2005 Plan

Mitigation Measure	Priority	Implementation Responsibility	Time Frame	2012 Status
Continue with Combined Sewer Overflow separation project.	High	LWSC	Years 1-5	East Lynn phase is complete and the project is 70 complete.
Camden Street/Little River drainage improvements.	High	LWSC	Years 1-3	Completed 2006.
Undertake dam rehabilitation work as identified in the 2003 inspections: Birch Pond, Breeds Pond, at Lantern Rock, Breeds Pond Outlet Dam.	High	LWSC	Years 1-3	All three dams have repaired and a maintenance plan put into place.
Install new pump station on Linton Road.	High	LWSC	Years 1-3	Completed 2006.
Map inundation areas for dams.	High	LWSC	Years 1-3	This project has been completed as of 2009.
Complete Valley Road drainage project.	Medium	LWSC	Years 2-4	Not completed: targeted for NHM grant.
Foster Pond dam upgrade.	Medium	LWSC, Swampscott DPW	Years 2-4	Not completed: target to complete with Valley Road

Mitigation Measure	Priority	Implementation Responsibility	Time Frame	2012 Status
				project.
Brush Fire equipment upgrades.	Low	Fire Department	Years 2-4	Not completed due to budget constraints: still needed.
Complete the City tree inventory.	Low	DPW	Years 3-5	60% complete.
Undertake a tree trimming program.	Low	DPW	Years 3-5	Completed.

Lynn has made considerable progress on implementing mitigation measures identified in the 2005 Hazard Mitigation Plan. Many of the measures identified in that plan are now considered on-going aspects of the regular work of City staff from the department head level to the regular work of Public Works staff. Individual projects have been incorporated into the City's capital improvement plan and the City continues to seek FEMA grant funding to implement the home elevation program. Moving forward into the next five year plan implementation period there will be many more opportunities to incorporate hazard mitigation into the City's decision making processes.

The challenges the City faces in implementing these measures are primarily due to limited funding and available staff time.

VIII. HAZARD MITIGATION STRATEGY

What is Hazard Mitigation?

Hazard mitigation means to permanently reduce or alleviate the losses of life, injuries and property resulting from natural and human-made hazards through long-term strategies. These long-term strategies include planning, policy changes, programs, projects and other activities. FEMA currently has three mitigation grant programs: the Hazards Mitigation Grant Program (HGMP), the Pre-Disaster Mitigation program (PDM), and the Flood Mitigation Assistance (FMA) program. The three links below provide additional information on these programs.

http://www.fema.gov/government/grant/hmgp/index.shtm

http://www.fema.gov/government/grant/pdm/index.shtm

http://www.fema.gov/government/grant/fma/index.shtm

Hazard Mitigation Measures can generally be sorted into the following groups:

- Prevention: Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and stormwater management regulations.
- Property Protection: Actions that involve the modification of existing buildings or infrastructure to protect them from a hazard or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, flood proofing, storm shutters, and shatter resistant glass.
- Public Education & Awareness: Actions to inform and educate citizens, elected officials, and property owners about the potential risks from hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.
- Natural Resource Protection: Actions that, in addition to minimizing hazard losses also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.
- Structural Projects: Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include storm water controls (e.g., culverts), floodwalls, seawalls, retaining walls, and safe rooms.
- Emergency Services Protection: Actions that will protect emergency services before, during, and immediately after an occurrence. Examples of these actions

include protection of warning system capability, protection of critical facilities, and protection of emergency response infrastructure.

(Source: *FEMA Local Multi-Hazard Mitigation Planning Guidance*)

Regional and Inter-Community Considerations

Some hazard mitigation issues are strictly local. The problem originates primarily within the municipality and can be solved at the municipal level. Other issues are inter-community issues that involve cooperation between two or more municipalities in a local area. There is a third level of mitigation which is regional; involving a state, regional, or federal agency or an issue that involves numerous municipalities across a wide area of the metropolitan region.

Regional Partners

In many communities, mitigating natural hazards, particularly flooding, is more than a local issue. The drainage systems that serve these communities are a complex system of storm drains, roadway drainage structures, pump stations and other facilities owned and operated by a wide array of agencies including but not limited to the City of Lynn, the Department of Conservation and Recreation (DCR), and Massachusetts Department of Transportation (MDOT). The planning, construction, operations, and maintenance of these structures are integral to the flood hazard mitigation efforts of communities. These agencies must be considered the communities regional partners in hazard mitigation. These agencies also operate under the same constraints as communities do, including budgetary and staffing constraints and numerous competing priorities. In the sections that follow, the plan includes recommendations for activities where cooperation with these other agencies may be necessary. Implementation of these recommendations will require that all parties work together to develop solutions.

Inter-Community Considerations

Fosters Pond Dam in Swampscott drains into Lynn and if it failed, would pose a problem in Lynn.

The Lynn Woods Reservation is owned by the City of Lynn and encompasses 2,200 acres in Lynn, Lynnfield and Saugus. The reservation contains several ponds and dams and is also a regional concern due to wildfires.

Hawes Pond dam in Saugus is of regional concern because a dam failure could impact commuters on Route 1.

Walden Pond Dam (and a portion of the pond) is in Saugus.

The Lynn LEPC felt that a possible regional mitigation measure would be the joint purchase of fire equipment or other specialized equipment that a single community would not be able to afford.

Sea Level Rise and Shoreline Environment – The coastal shoreline of the North Shore area is a dynamic environment where forces of sea-level rise, erosion and deposition of are constantly at work changing the shoreline profile. This process disregards municipal boundaries as sand and other materials are moved along the coast. Shoreline protection measures such as sea walls, jetties, and others have an impact on this process with the potential of building up materials in some areas while stripping it away from others. In Lynn, a shoreline issue of regional concern is the need for additional storm water and storm surge storage capacity

Municipalities along the North Shore should work to understand how these processes and others associated with sea level rise and storm surge are at work locally and consider mutually beneficial means of protecting their shore side communities from the impacts of storm damage and sea-level rise. Lynn should consider participating within a regional sea level rise action work group to help plan for and address sea level rise, storm surge and related climate adaptation issues on a regional basis.

Process for Setting Priorities for Mitigation Measures

The decision on priorities was made at a meeting of the local committee. The method used was to reach consensus through discussion, rather than taking a vote. Priority setting was based on local knowledge of the hazard areas, cost information and an assessment of benefits.

MAPC staff attended the FEMA Benefit-Cost Analysis Training Course on October 31-November 1, 2005 and on October 24-25, 2007. Information from this training was shared with local officials in order to help them understand the role of a benefit/cost analysis in developing and evaluating potential mitigation projects.

Based on information gained from the Benefit-Cost Analysis trainings and a review of the STAPLEE criteria (a checklist for evaluating social, technical, administrative, political, legal, economic and environmental issues) MAPC asked the local committee to take into consideration factors such as the number of homes and businesses affected, whether or not road closures occurred and what impact closures had on delivery of emergency services and the local economy, anticipated project costs, whether the City had the technical and administrative capability to carry out the mitigation measures, whether any environmental constraints existed, and whether the City would be able to justify the costs relative to the anticipated benefits. **See Table 18**.

High Priority Mitigation Measures

Flooding, Drainage Infrastructure and Dams

- Upgrade drainage system on Surfside Road.
- Install wave attenuator at Seaport Landing facility.
- Upgrade Valley Road culvert.
- Lower Western Interceptor: mitigate low elevation issue and tidal backup.
- Install Ipswich River pumps station levee.
- Finish digital mapping of city drainage system.

Dams

- Upgrade the Foster Pond Dam headwall in conjunction with Swampscott DPW.

Measures to Ensure Compliance with NFIP

- The City should consider participating in the FEMA Community Rating System (CRS) program to lower flood hazard risk, raise community awareness and quality for lower flood hazard insurance premiums.
- Floodplain District Management: Consider adding Floodplain Zoning District and associated building regulations for floodplain areas. Update this district to remain consistent with FEMA guidelines and floodplain mapping.
- Continue to enforce all wetlands ordinances and regulations.
- Floodplain Mapping: Maintain up to date maps of local FEMA identified floodplains. The City anticipates updated National Flood Insurance Rate maps in 2012.
- Acquisition of Vacant Flood Prone Lands: Acquire priority open space parcels in floodplain areas in order to maintain flood storage and water infiltration capacity. The 2010 Lynn Open Space and Recreation Plan includes the acquisition of land along the Saugus River as one its goals.

Multi Hazard

- Emergency Power Generators: Upgrade all emergency power generators in emergency shelters and critical facilities as needed; provide alternative fuel sources and generator power source flexibility. Upgrading fixed generators at three Lynn fire stations and the LWSC facility are top public safety priorities. Install new diesel, fixed location generator at the Reservoir Pumping Station.

- Purchase new light tower.

- Purchase two electronic signboards.

- Upgrade LWSC handheld radios and repeater station.

Brush Fires

- Purchase new 4x4 fire truck, pump and forestry hose.

- Purchase two new ATV's for brush fire access and equipment hauling.

Winter Storms

- The City shares a large percentage of its snow and ice road clearing duties with MA DOT. Lynn would like to better coordinate with MA DOT to ensure mutual enforcement of winter no-parking ordinances during storm events and prompt sidewalk snow removal following storm events.

- Lynn should consider partnering with MEMA and FEMA to design and implement a winter storm preparedness program that reduces the risk to life, property and utility systems.

- Develop partnerships with utility providers to document known hazards

Medium Priority Mitigation Measures

Flooding, Drainage Infrastructure and Dams

- Consider updating site plan review, subdivision and Planned Unit Development stormwater standards by referencing MA Stormwater Standards.

- Install upgraded drainage outlet at Flax Pond.

- Upgrade the Magnolia Avenue sewer line to eliminate inflow and infiltration.
- Upgrade drainage at Cedar Pond outlet.

- Upgrade drainage at Floating Bridge Pond outlet.

- Upgrade Johnson street drainage to eliminate Combined Sewer Overflow events during heavy precipitation events.

- Continue to conduct beaver management and relocation program.

- Create a climate change preparedness strategy with adaptation goals and actions.

Wind Related

- Update and implement the tree maintenance program with additional funding. Distribute information to property owners to reduce risk of tree failure to life, property and utility systems; identify potentially hazardous trees in critical areas; increase tree program staffing as possible to identify and remove hazardous trees.

Winter Storms

- Consider participating in a regional Sea Level Rise Action Work Group with neighboring coastal communities to draft and implement preparedness actions for winter storms, storm surge and associated sea level rise coastal hazards.

Lower Priority Mitigation Measures

Geologic Related

- Public Building Assessments: Assess the earthquake vulnerability of all public buildings. Investigate options to make all public buildings earthquake-resistant.

Flooding and Drainage Infrastructure

- Develop a City-base wetlands mapping capacity that would include an all local wetlands delineations data base

- Create and implement a wetlands, flooding, and stormwater education and outreach program for Lynn residents that incorporates new NFIP map and program information.

Analysis of Mitigation Projects

An analysis of the proposed mitigation projects, using STAPLEE criteria as outlined on page 57, has been completed and is summarized in Table 16.

For Table 16, the following symbols apply to indicate degree of Hazard Mitigation Alternative Acceptability:

- = Acceptable
- = Somewhat Acceptable

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	TABLE 18- EVALUATION OF PRIORITY HAZARDS MITIGATION ALTERNATIVES								
	PROJECTS ALTERNATIVE	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	Cost Range
High Priority Alternatives-Flooding									
Flooding	Surfside Road drain lines	•	•	•	•	•	•	•	High
Flooding	Install wave attenuator at Seaport Landing Facility	•	•	•	•	•	•	•	High
Flooding	Valley Road: upgrade culvert and screen debris	•	•	•	•	•	•	•	High
Flooding	Lower Western Interceptor: mitigate low elevation issue and tidal backup	•	•	•	•	•	•	•	Very High
Flooding	Ipswich River Pump Station levee	•	•	•	•	•	•	•	High
Flooding	Finish digital mapping of drainage system	•	•	•	•	•	•	•	High
Flooding	Finish digital drainage system mapping	•	•	•	•	•	•	•	High

	TABLE 18- EVALUATION OF PRIORITY HAZARDS MITIGATION ALTERNATIVES								
	PROJECTS ALTERNATIVE	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	Cost Range
Flooding	Foster Pond dam headwall	•	•	•	•	•	•	•	High
Flooding	Consider using FEMA Community Rating System	•	•	•	•	•	•	•	Low
Flooding	Adopt and enforce Floodplain Zoning Districts and associated building regulations for floodplain areas; update district as needed to consistent with FEMA guidelines	•	•	•	•	•	•	•	Moderate
Flooding	Continue to enforce all wetlands ordinances and regulations	•	•	•	•	•	•	•	Moderate
Flooding	Floodplain mapping updates; Lynn expects to receive new maps in 2012	•	•	•	•	•	•	•	Low
Flooding	Purchase vacant flood prone lands with focus on	•	•	•	•	•	•	•	Moderate

	TABLE 18- EVALUATION OF PRIORITY HAZARDS MITIGATION ALTERNATIVES								
	PROJECTS ALTERNATIVE	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	Cost Range
	Saugus River Flooding floodplain								
High Priority Alternatives-Multi Hazard									
Multi Hazard	Update or install new fixed generators	•	•	•	•	•	•	•	Moderate
Multi Hazard	Purchase new light tower	•	•	•	•	•	•	•	Low
Multi Hazard	Purchase two electronic signboards	•	•	•	•	•	•	•	Low
Multi Hazard	Upgrade LWSC communications	•	•	•	•	•	•	•	Moderate
High Priority Alternatives- Brush Fires									
Brush Fires	Purchase new brush fire truck and equipment	•	•	•	•	•	•	•	Moderate
Brush Fires	Purchase two ATV's for brush fire fighting and hauling	•	•	•	•	•	•	•	Moderate
High Priority Alternatives-Winter Storms									
Winter Storms	Coordinated parking and snow removal program	•	•	•	•	•	•	•	Low

	TABLE 18- EVALUATION OF PRIORITY HAZARDS MITIGATION ALTERNATIVES								
	PROJECTS ALTERNATIVE	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	Cost Range
Winter Storms	Partner with utilities to document known hazards	•	•	•	•	•	•	•	Low
Medium Priority Alternatives-Flooding									
Flooding	Update subdivision, PUD, and site plan review stormwater standards	•	•	•	•	•	•	•	Low
Flooding	Upgrade Flax Pond outlet	•	•	•	•	•	•	•	High
Flooding	Upgrade Magnolia Avenue sewer line for I and I problems	•	•	•	•	•	•	•	High
Flooding	Upgrade Cedar Pond outlet	•	•	•	•	•	•	•	High
Flooding	Upgrade Johnson Street for CSO problems	•	•	•	•	•	•	•	High
Flooding	Continue Beaver Management Program	•	•	•	•	•	•	•	Moderate
Flooding	Climate change strategy	•	•	•	•	•	•	•	Moderate
Medium Priority Alternatives-Wind Related									
Wind Related	Increase tree	•	•	•	•	•	•	•	Moderate

	TABLE 18- EVALUATION OF PRIORITY HAZARDS MITIGATION ALTERNATIVES								
	PROJECTS ALTERNATIVE	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	Cost Range
	maintenance program								
Medium Priority Alternatives- Winter Storms									
Winter Storms	Regional Sea Level Rise Action Group	•	•	•	•	•	•	•	Low
Winter Storms	Consider partnering with MEMA and FEMA to design and implement a winter storm preparedness program	•	•	•	•	•	•	•	Low
Lower Priority Alternatives- Geologic									
Geologic	Assess public building earthquake vulnerability	•	•	•	•	•	•	•	Moderate
Lower Priority Alternatives- Flooding									
	Wetlands delineation and database	•	•	•	•	•	•	•	Moderate
	Dredge Washburn Avenue outfall and chokepoint	•	•	•	•	•	•	•	Moderate

	TABLE 18- EVALUATION OF PRIORITY HAZARDS MITIGATION ALTERNATIVES								
	PROJECTS ALTERNATIVE	Socially Acceptable	Technically Feasible	Administratively Possible	Politically Acceptable	Legal	Economically Sound	Environmentally Sound	Cost Range
	Outreach program	•	•	•	•	•	•	•	Low

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Introduction to Mitigation Measures Table

Priority – The designation of high, medium, or low priority was done at the meeting of the Local Multiple Hazard Community Planning Team meeting. The designations reflect discussion and a general consensus developed at the meeting but could change as conditions in the community change. In determining project priorities, the local team considered potential benefits and project costs.

Hazard Area – Each mitigation measure is intended to address one or more of the natural hazard potentially impacting Lynn, such as Flooding, Wind, Fire, and Earthquake. Where the proposed measure is intended to address a specific locally identified area of concern, this area is identified as well.

Description of the Mitigation Measure – The description of each mitigation measure is brief and cost information is given only if cost data were already available from the community. The cost data represent a point in time and would need to be adjusted for inflation and for any changes or refinements in the design of a particular mitigation measure.

Measure Type – There are six different types of pre-disaster mitigation measures identified by FEMA for which a community may apply for Hazard Mitigation funding.

Implementation Responsibility – The designation of implementation responsibility was done by MAPC based on a general knowledge of what each municipal department is responsible for. It is likely that most mitigation measures will require that several departments work together and assigning staff is the sole responsibility of the governing body of each community.

Time Frame – The time frame was based on a combination of the priority for that measure, the complexity of the measure and whether or not the measure is conceptual, in design, or already designed and awaiting funding. Because the time frame for this plan is five years, the timing for all mitigation measures has been kept within this framework. The identification of a likely time frame is not meant to constrain a community from taking advantage of funding opportunities as they arise.

Potential Funding Sources – This column attempts to identify the most likely sources of funding for a specific measure. The information on potential funding sources in this table is preliminary and varies depending on a number of factors. These factors include whether or not a mitigation measure has been studied, evaluated or designed, or if it is still in the conceptual stages. MEMA and DCR assisted MAPC in reviewing the potential eligibility for hazard mitigation funding. Each grant program and agency has specific eligibility requirements that would need to be taken into consideration. In most instances, the measure will require a number of different funding sources. Identification of a potential funding source in this table does not guarantee that a project will be eligible

for, or selected for funding. Upon adoption of this plan, the local committee responsible for its implementation should begin to explore the funding sources in more detail.

Additional information on funding sources – The best way to determine eligibility for a particular funding source is to review the project with a staff person at the funding agency. The following websites provide an overview of programs and funding sources.

Army Corps of Engineers (ACOE) – The website for the North Atlantic district office is http://www.nae.usace.army.mil/. The ACOE provides assistance in a number of types of projects including shoreline/streambank protection, flood damage reduction, flood plain management services and planning services.

Massachusetts Emergency Management Agency (MEMA) – The grants page http://www.mass.gov/dem/programs/mitigate/grants.htm has a useful table that compares eligible projects for the Hazard Mitigation Grant Program and the Flood Mitigation Assistance Program.

United States Department of Agriculture – The USDA has programs by which communities can get grants for firefighting needs. See the link below for some example.

http://www.rurdev.usda.gov/rd/newsroom/2002/cfg.html

Abbreviations Used in Table 19

FEMA Mitigation Grants includes:
- FMA = Flood Mitigation Assistance Program.
- HMGP = Hazard Mitigation Grant Program.
- PDM = Pre-Disaster Mitigation Program

ACOE = Army Corps of Engineers.

MHD = Massachusetts Highway Department.

EOT = Executive Office of Transportation.

DCR = Department of Conservation and Recreation

DHS/EOPS = Department of Homeland Security/Emergency Operations

EPA/DEP (SRF) = Environmental Protection Agency/Department of Environmental Protection (State Revolving Fund)

LWSC= Lynn Water and Sewer Commission

OECD = Lynn Office of Economic and Community Development

Table 19
Potential Mitigation Measures

Hazard Area	Mitigation Measures	Measure Type	Implementation Responsibility	Time Frame	Estimated Cost	Potential Funding Sources
High Priority Mitigation Measures						
Flooding	Surfside Road: upgrade drain lines	Structural Projects	LWSC	2012-2014	$250,000	Lynn/FEMA
Flooding	Install wave attenuator at Seaport Landing Facility	Structural Projects	OECD	2012-2015	$500,000	Lynn/FEMA
Flooding	Valley Road: upgrade culvert and screen debris	Structural Projects	LWSC	2012-2014	$400,000	Lynn/FEMA
Flooding	Lower Western Interceptor: mitigate low elevation issue and tidal backup	Structural Projects	LWSC	2013-2015	$54 million overall	Lynn/FEMA
Flooding	Ipswich River Pump Station levee	Structural	LWSC	2012-2017	$250,000	Lynn/FEMA
Flooding	Finish digital mapping of	Prevention	LWSC	2012-2017	$350,000	Lynn/FEMA

Hazard Area	Mitigation Measures	Measure Type	Implementation Responsibility	Time Frame	Estimated Cost	Potential Funding Sources
	drainage system					
Flooding	Continue to enforce the Floodplain Zoning District and associated building regulations for floodplain areas; update district as needed to consistent with FEMA guidelines	Public Information and Mapping; Flood Damage Reduction, Flood Preparedness	Building Department	Continue to enforce the Floodplain Zoning District and associated building regulations for floodplain areas; update district as needed to consistent with FEMA guidelines	Public Information and Mapping; Flood Damage Reduction, Flood Preparedness	Flooding
Flooding	Floodplain mapping updates; Lynn expects to receive new maps in 2012	Natural Resource Protection	ComDev/ Conservation Commission	2012- 2017	$5,000 per year	Lynn
Flooding	Continue to enforce all wetlands ordinances and regulations.	Natural Resource Protection	Planning/ Conservation Commission	2012-2017	$20,000 per year in staff time	Lynn

Hazard Area	Mitigation Measures	Measure Type	Implementation Responsibility	Time Frame	Estimated Cost	Potential Funding Sources
Multi-hazard						
Multi-hazard	Upgrade fixed, emergency power generators: 3 Fire Stations, LWSC	Emergency Services Protection	Fire/LWSC	2012-2014	$100,000	Lynn
Multi-hazard	Purchase new light tower	Emergency Services Protection	LWSC	2012-2014	$20,000	Lynn
Multi-hazard	Purchase two electronic signboards	Emergency Services Protection	Fire/Police	2012-2014	$35,000	Lynn
Multi-hazard	Upgrade and LWSC handheld radios and repeater station	Emergency Services Protection	LWSC	2012-2016	$75,000	Lynn
Fires						
Brush Fires	Purchase new 4x4 fire truck, pump and forestry hose	Emergency Services Protection	Fire	2012-2015	$125,000	Lynn
Brush Fires	Purchase two ATV's	Emergency Services Protection	Fire	2012-2015	$20,000	Lynn
Winter Storms						
Winter Storms	Coordinated	Emergency	DPW/Police/	2012-2017	Staff cost	Lynn/ DCR/

Hazard Area	Mitigation Measures	Measure Type	Implementation Responsibility	Time Frame	Estimated Cost	Potential Funding Sources
	snow removal and parking program	Services Protection	DCR/MA DOT		estimated to be $10,000/year	MA DOT
	Winter Storm Preparedness	Prevention	DPW/FEMA/ MEMA	2012-2017	$5,000/year staff time	Lynn/DCR
	Partner with utility to document hazard areas	Prevention	DPW/Utilities	2012-2017	$2,500/year staff time	Lynn/ Utilities
Medium Priority Mitigation Measures						
Flooding	Flax Pond @Maple Street: install upgraded outlet	Structural Project	LWSC	2012- 2017	$350,000	Lynn/FEMA
Flooding	Magnolia Avenue: upgrade sewer line to eliminate I &I	Structural Project	LWSC	2012-2017	$300,000	Lynn/FEMA
Flooding	Cedar Pond	Structural Project	LWSC	2014-2017	$500,000	Lynn/FEMA
Flooding	Floating Bridge Pond Outlet	Structural Project	LWSC	2012- 2017	$250,000	Lynn/FEMA
Flooding	Johnson Street: CSO backup	Structural Project	LWSC	2012- 2017	$800,000	Lynn/FEMA
Flooding	Beaver Management	Prevention	ConsComm/ LWSC	2012-2017	$10,000/year	Lynn

Hazard Area	Mitigation Measures	Measure Type	Implementation Responsibility	Time Frame	Estimated Cost	Potential Funding Sources
	Plan					
Flooding	Master/ Drainage Plan Climate Adaptation Update	Prevention	Planning	2012-2017	$50,000	Lynn
Wind Related						
Wind Related	Update tree maintenance program	Emergency Services	DPW	2012-2015	$15,000/year staff time	Lynn/ FEMA
Winter Storms						
Winter Storms	Regional Sea Level Rise Action Work Group participation	Prevention	Planning/DPW/ Conservation Commission	2012- 2017	$5,000 per year staff time	Lynn
Lower Priority Mitigation Measures						
Geologic	Assess earthquake vulnerability	Prevention	Planning	2012-2016	$20,000	Lynn
Flooding						
Flooding	Wetlands and wetlands delineations database	Natural Resource Protection	Planning/ Conservation Commission	2012- 2017	$20,000	Lynn/DCR
Flooding	Wetlands and Stormwater Outreach program	Natural Resource Protection/Prevention	Conservation Commission	2012-2017	$2,500 per year staff time	

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IX. PLAN ADOPTION AND MAINTENANCE

Plan Adoption

The Lynn Hazard Mitigation Plan was adopted by the City Council on [ADD DATE]. See Appendix D for documentation. The plan was approved by FEMA on [ADD DATE] for a five-year period that will expire on [ADD DATE].

Plan Maintenance

MAPC worked with the Lynn Hazard Mitigation Planning Team to prepare this plan. This group will continue to meet on an as-needed basis to function as the Local Hazard Mitigation Implementation Group, with one City official designated as the coordinator. Additional members could be added to the local implementation group from businesses, non-profits, and institutions.

Implementation Schedule

Bi-Annual Survey on Progress– The coordinator of the Hazard Mitigation Implementation Team will prepare and distribute a biannual survey in years two and four of the plan. The survey will be distributed to all of the local implementation group members and other interested local stakeholders. The survey will poll the members on any changes or revisions to the plan that may be needed, progress and accomplishments for implementation, and any new hazards or problem areas that have been identified.

This information will be used to prepare a report or addendum to the local hazard mitigation plan. The Hazard Mitigation Implementation Team will have primary responsibility for tracking progress and updating the plan.

Develop a Year Four Update – During the fourth year after initial plan adoption, the coordinator of the Hazard Mitigation Implementation Team will convene the team to begin to prepare for an update of the plan, which will be required by the end of year five in order to maintain approved plan status with FEMA. The team will use the information from the year four biannual review to identify the needs and priorities for the plan update.

Prepare and Adopt an Updated Local Hazard Mitigation Plan – FEMA's approval of this plan is valid for five years, by which time an updated plan must be approved by FEMA in order to maintain the City's approved plan status and its eligibility for FEMA mitigation grants. Because of the time required to secure a planning grant, prepare an updated plan, and complete the approval and adoption of an updated plan, the local Hazard Mitigation Planning Team should begin the process by the end of Year 3. This will help the City avoid a lapse in its approved plan status and grant eligibility when the current plan expires.

At this point, the Hazard Mitigation Implementation Team may decide to undertake the update themselves, contract with the Metropolitan Area Planning Council to update the plan or to hire another consultant. However the Hazard Mitigation Implementation Team decides to update the plan, the group will need to review the current FEMA hazard

mitigation plan guidelines for any changes. The update of the Lynn Hazard Mitigation Plan will be forwarded to MEMA and DCR for review and to FEMA for approval.

Integration of the Plans with Other Planning Initiatives

Upon approval of the Lynn Hazard Mitigation Plan by FEMA, the Local Hazard Mitigation Implementation Team will provide all interested parties and implementing departments with a copy of the plan and will initiate a discussion regarding how the plan can be integrated into that department's ongoing work. At a minimum, the plan will be reviewed and discussed with the following departments:

- Fire / Emergency Management
- Police
- Public Services / Highway
- Engineering
- Planning and Community Development
- Conservation
- Parks and Recreation
- Health
- Building

Other groups that will be coordinated with include large institutions, Chambers of Commerce, land conservation organizations and watershed groups. The plans will also be posted on a community's website with the caveat that local team coordinator will review the plan for sensitive information that would be inappropriate for public posting. The posting of the plan on a web site will include a mechanism for citizen feedback such as an e-mail address to send comments.

X. LIST OF REFERENCES

In addition to the specific reports listed below, much of the technical information for this plan came from meetings with City department heads and staff.

FEMA Local Multi-Hazard Mitigation Planning Guidance, July 1, 2008

North Shore Regional Multi Hazard Mitigation Plan: Lynn Annex, December, 2005

Saugus River and Tributaries Flood Damage Reduction Project, US Army Corps of Engineers, 1989

City of Lynn General Ordinances

City of Lynn Zoning Bylaw

City of Lynn, Subdivision Control Regulations

Lynn Water and Sewer Capital Improvement Program 2012- 2015

City of Lynn, Comprehensive Emergency Management Plan

2010 Lynn Open Space and Recreation Plan

Lynn Waterfront Master Plan Report, September, 2007

Commonwealth of Massachusetts, MacConnell Land Use Statistics, 2005

Metropolitan Area Planning Council, Geographic Information Systems Lab

Metropolitan Area Planning Council, Regional Plans and Data

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APPENDIX A
MEETING AGENDAS

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Don Boyce
Director

Richard Sullivan
COMMISSIONER

Marc D. Draisen
Executive Director

The Commonwealth of Massachusetts

DEVAL PATRICK, GOVERNOR

Massachusetts Emergency Management Agency
400 WORCESTER ROAD, FRAMINGHAM, MA 01702-5399 508-820-2000 FAX 508-820-1404

Department of Conservation and Recreation
251 CAUSEWAY STREET, SUITE 600-900, BOSTON, MA 02114-2104 617-626-1250 FAX 617-626-1351

Metropolitan Area Planning Council
60 TEMPLE PLACE, 6TH FLOOR, BOSTON, MA 02111 617-451-2770 FAX 617-482-7185

North Shore Hazard Mitigation Planning Team

NORTH SHORE Hazard Mitigation Planning TEAM

Lynn
Lynn
Nahant
Lynn
Lynn
Salem
Saugus
Swampscott
Lynn

First Meeting

Monday, February 8, 10:00 AM

Saugus Public Safety Building
2nd Floor Training Room
27 Hamilton Street, Saugus, MA
(Map & directions attached)

AGENDA

10:00 WELCOME & INTRODUCTIONS

10:05 OVERVIEW OF HAZARD MITIGATION PLANNING & GRANTS

- State Hazard Mitigation Plan & FEMA Grants–Sarah White, MEMA
- Regional & Local Mitigation Plans - Martin Pillsbury, MAPC

10:20 UPDATING THE NORTH SHORE HAZARD MITIGATION PLAN

- FEMA Requirements & Grant Eligibility
- Review of Scope of Work & Schedule –MAPC
- Questions & Discussion – Local issues & Priorities

10:50 GETTING STARTED: MAPPING AND CRITICAL FACILITIES DATABASE FOR THE NORTH SHORE PLAN UPDATE

- Susan Brunton, GIS Analyst, MAPC

11:15 NEXT STEPS / ADJOURN

If you have any questions please contact Martin Pillsbury at MAPC:
617-451-2770, ext. 2012 or **mpillsbury@mapc.org**

Lynn Predisaster Mitigation Renewal Planning Meeting
March 15, 2011
Lynn City Hall
10 – 12
Agenda

1. Welcome and Introductions

2. Project Overview (*Sam Cleaves, MAPC*)

3. Survey Handout and Ortho Map Markup of Hazardous Areas/ Conversation:

   What has changed from 2005 PDM Plan?

   Review past Areas of Concern and Potential Areas of Development, Priority Projects

   Plan Update:

   - What floods? How often? Any new mitigation studies done? What mitigation measures have been done or planned for? High or low priority?

   - Other hazards: Brush fires, dams, earthquake, high winds? What areas? Dam studies available?

   - Map known future development areas? Type, size, status of permitting

4. Review Draft Project Goals: See over

5. Discuss Project Outreach: See over

6. Review mitigation projects: community actions and new priority projects/costs

7. Next Steps: Follow up with individuals as needed, continue information gathering, set priority mitigation projects and costs, maximize community collaboration on projects

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Project Overview - MAPC received a grant to prepare natural hazards *Pre-Disaster Mitigation Plan* for the communities of Beverly, Lynn, Nahant, Lynn, Lynn, Salem, Saugus, Swampscott and Lynn. MAPC is working with the nine communities to update their plans to mitigate potential damages of natural hazards such as floods, winter storms, hurricanes, earthquakes and wild fires, before such hazards occur. The federal *Disaster Mitigation Act of 2000* requires that all municipalities adopt a *Pre-Disaster Mitigation Plan* for natural hazards in order to remain eligible for FEMA Disaster Mitigation Grants.

Public Participation Options

1. Presentation by City/City staff to local groups.
2. MAPC presents at public meetings – existing board or commissions
3. Post on City/City website with a set public review period.
4. Distribute to specified organizations or boards/commissions for their review.
5. Create a summary document and distribute in community

Draft Sample Goals

1. Prevent and reduce the loss of life, injury, public health impacts and property damages resulting from all major natural hazards.

2. Identify and seek funding for measures to mitigate or eliminate each known significant flood hazard area.

3. Integrate hazard mitigation planning as an integral factor in all relevant municipal departments, committees and boards.

4. Prevent and reduce the damage to public infrastructure resulting from all hazards.

5. Encourage the business community, major institutions and non-profits to work with the City/City to develop, review and implement the hazard mitigation plan.

6. Work with surrounding communities, state, regional and federal agencies to ensure regional cooperation and solutions for hazards affecting multiple communities.

7. Ensure that future development meets federal, state and local standards for preventing and reducing the impacts of natural hazards.

8. Take maximum advantage of resources from FEMA and MEMA to educate City staff and the public about hazard mitigation.

Second Lynn Team Meeting Agenda May 10, 2012

Hello Everyone

I would like to set up a meeting to review the Hazard Mitigation Plan for Lynn on Thurs May 10th at 10:00-11:30 AM in room 302 at City Hall. Sam Cleaves from MAPC, who is preparing our Hazard Mitigation Plan, will attend the meeting as well.

Sam will send out the project list prior to the meeting.

Here is an agenda for the meeting:

10:00 Welcome & Purpose

10:10 Review Hazard Mitigation Project Priority List
Adjustments, cost, and timelines

11:10 Plan Implementation

11:30 Adjourn

Please let me know if you are able to attend.

Tom

Lt. Thomas Hines
Office of Emergency Management
Lynn Fire Department
725 Western Ave
Lynn, MA 01905
Bus: 781-593-1234
Cell: 781-389-2447
thines@lynnma.gov

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APPENDIX B
HAZARD MAPPING

The MAPC GIS (Geographic Information Systems) Lab produced a series of maps for each community. Some of the data came from the Northeast States Emergency Consortium (NESEC). More information on NESEC can be found at http://www.serve.com/NESEC/. Due to the various sources for the data and varying levels of accuracy, the identification of an area as being in one of the hazard categories must be considered as a general classification that should always be supplemented with more local knowledge. The documentation for some of the hazard maps was incomplete as well.

The map series consists of four panels with two maps each plus one map taken from the State Hazard Mitigation Plan.

Map 1.	Population Density
Map 2.	Potential Development
Map 3.	Flood Zones
Map 4.	Earthquakes and Landslides
Map 5.	Hurricanes and Tornadoes
Map 6.	Average Snowfall
Map 7.	Composite Natural Hazards
Map 8.	Hazard Areas

Map1: Population Density – This map uses the US Census block data for 2000 and shows population density as the number of people per acre in seven categories with 60 or more people per acre representing the highest density areas.

Map 2: Potential Development – This map shows potential future developments, and critical infrastructure sites. MAPC consulted with City staff to determine areas that were likely to be developed or redeveloped in the future.

Map 3: Flood Zones – The map of flood zones used the FEMA NFIP Flood Zones as its source. For more information, refer to the FEMA Map Service Center website http://www.msc.fema.gov. The definitions of the flood zones are described in detail on this site as well. The flood zone map for each community also shows critical infrastructure and municipally owned and protected open space.

Map 4: Earthquakes and Landslides – This information came from NESEC. For most communities, there was no data for earthquakes because only the epicenters of an earthquake are mapped.

The landslide information shows areas with either a low susceptibility or a moderate susceptibility to landslides based on mapping of geological formations. This mapping is highly general in nature. For more information on how landslide susceptibility was mapped, refer to http://pubs.usgs.gov/pp/p1183/pp1183.html.

Map 5: Hurricanes and Tornadoes – This map shows a number of different items. The map includes the storm tracks for both hurricanes and tropical storms. This information must be viewed in context. A storm track only shows where the eye of the storm passed through. In most cases, the effects of the wind and rain from these storms were felt in other communities even if the track was not within that community. This map also shows the location of tornadoes with a classification as to the level of damages. What appears on the map varies by community since not all communities experience the same wind-related events. These maps also show the 100 year wind speed.

Map 6: Average Snowfall - - This map shows the average snowfall and open space. It also shows storm tracks for nor'easters, if any storms tracked through the community.

Map 7: Composite Natural Hazards - This map shows four categories of composite natural hazards for areas of existing development. The hazards included in this map are 100 year wind speeds of 110 mph or higher, low and moderate landslide risk, FEMA Q3 flood zones (100 year and 500 year) and hurricane surge inundation areas. Areas with only one hazard were considered to be low hazard areas. Moderate areas have two of the hazards present. High hazard areas have three hazards present and severe hazard areas have four hazards present.

Map 8: Hazard Areas – For each community, locally identified hazard areas are overlaid on an aerial photograph dated April, 2008. The critical infrastructure sites are also shown. The source of the aerial photograph is Mass GIS.

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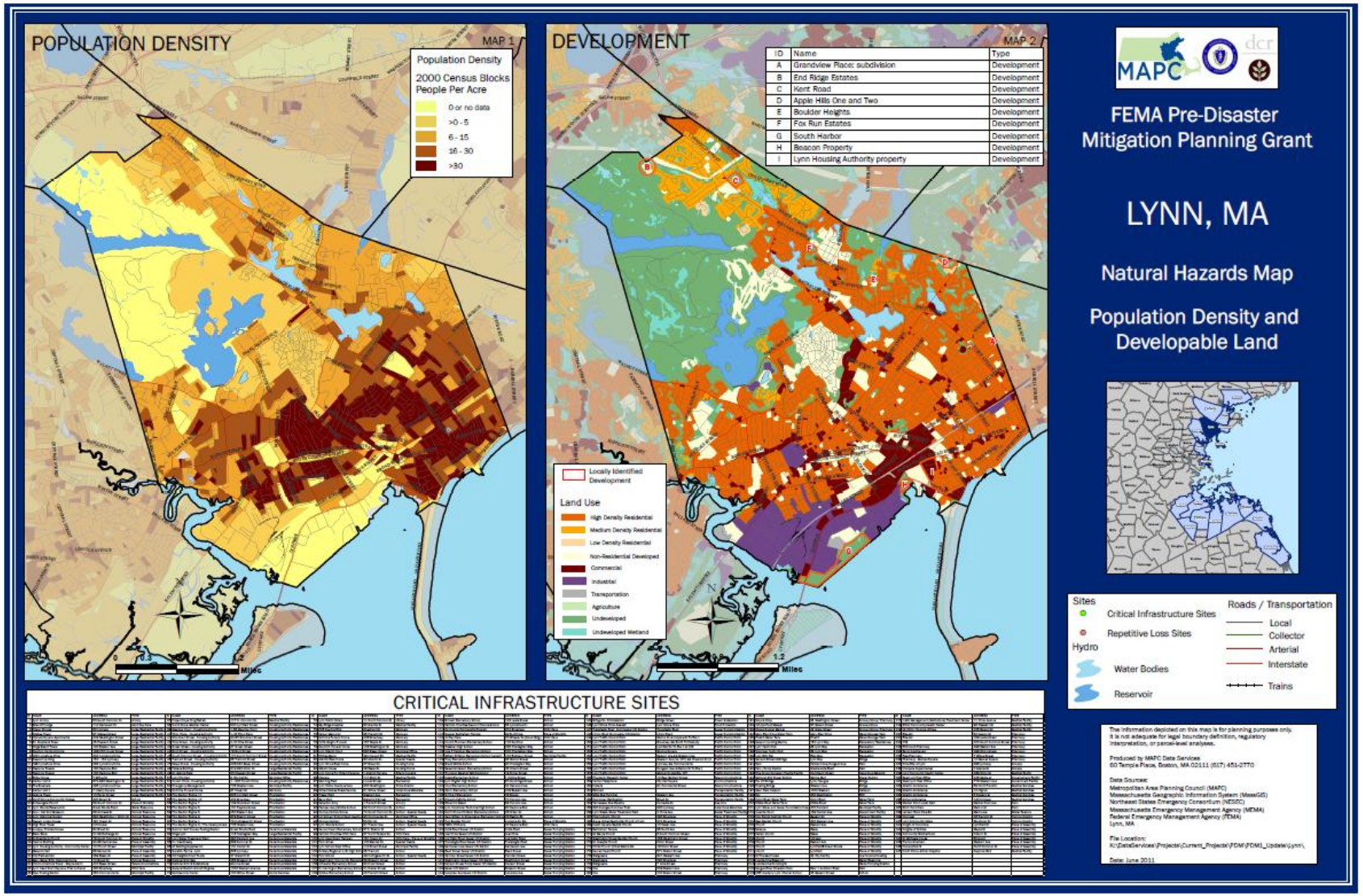
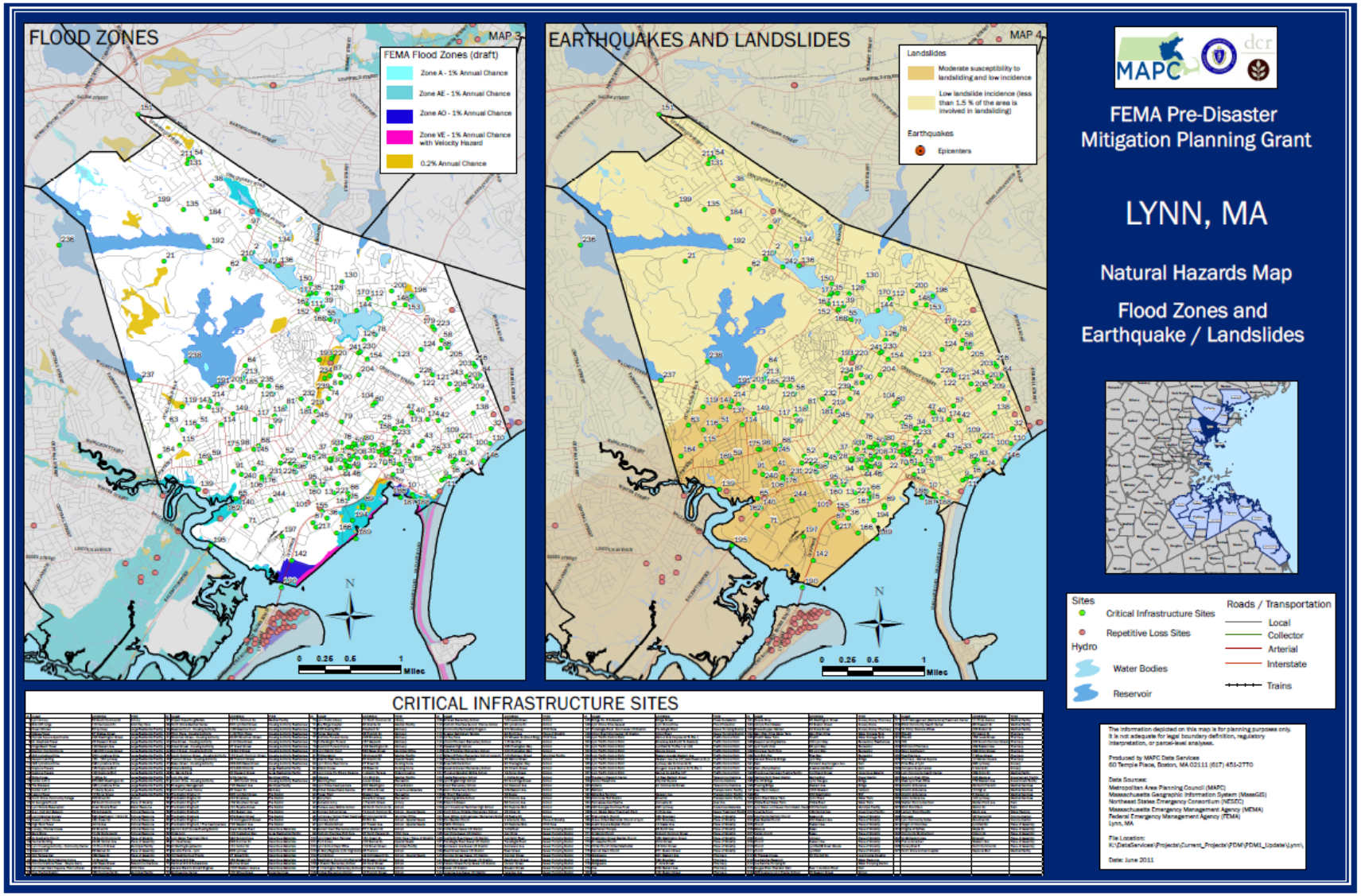
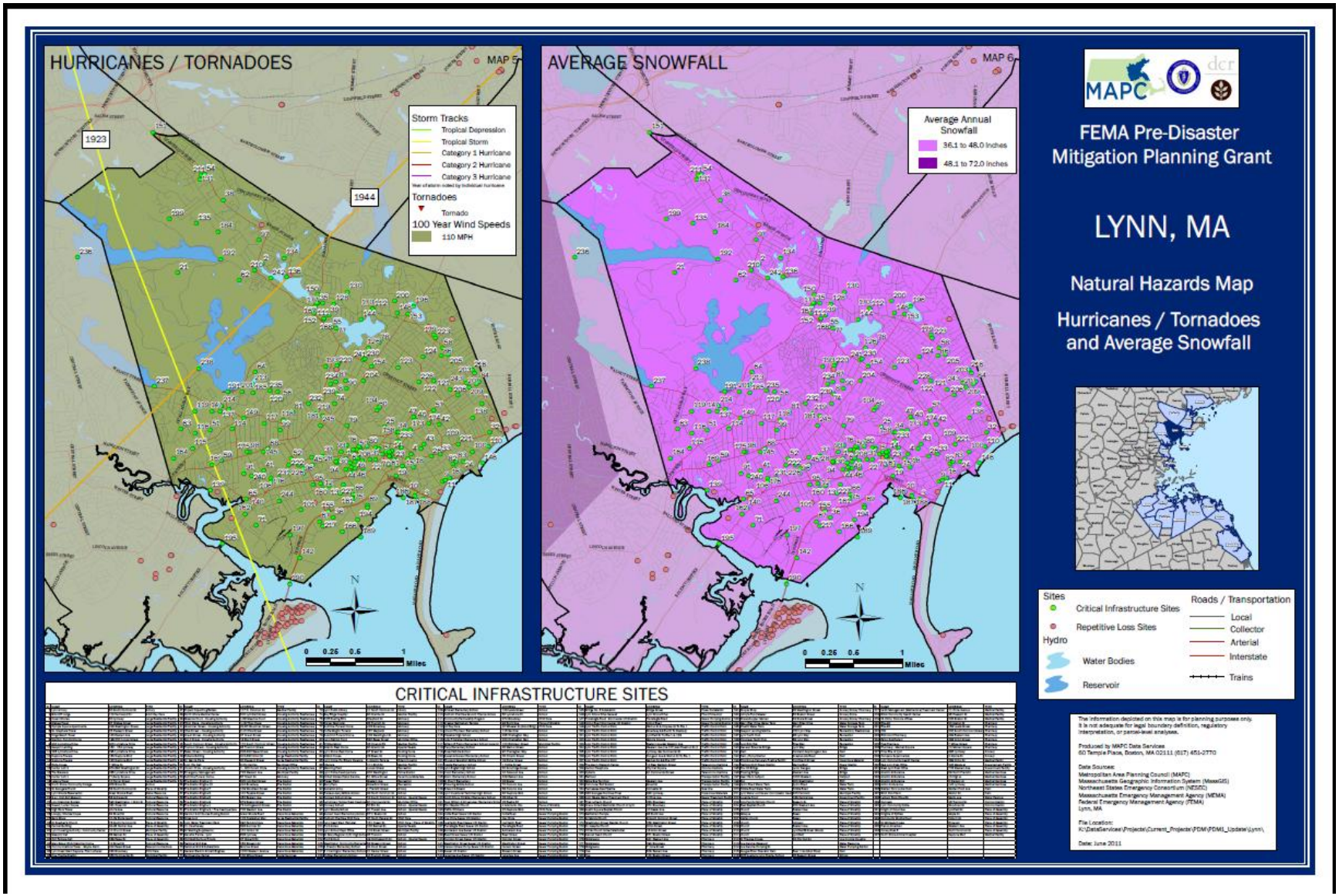

POPULATION DENSITY
MAP 1
Population Density
2000 Census Blocks
People Per Acre
0 or no data
>0 - 5
6 - 15
16 - 30
>30
DEVELOPMENT
MAP 2
ID Name Type
A Grandview Place: subdivision Development
B End Ridge Estates Development
C Kent Road Development
D Apple Hills One and Two Development
E Boulder Heights Development
F Fox Run Estates Development
G South Harbor Development
H Beacon Property Development
I Lynn Housing Authority property Development
Locally Identified Development
Land Use
High Density Residential
Medium Density Residential
Low Density Residential
Non-Residential Developed
Commercial
Industrial
Transportation
Agriculture
Undeveloped
Undeveloped Wetland
Miles
MAPC
dcr
FEMA Pre-Disaster Mitigation Planning Grant
LYNN, MA
Natural Hazards Map
Population Density and Developable Land
Sites
Critical Infrastructure Sites
Repetitive Loss Sites
Hydro
Water Bodies
Reservoir
Roads / Transportation
Local
Collector
Arterial
Interstate
Trains
CRITICAL INFRASTRUCTURE SITES
The information depicted on this map is for planning purposes only. It is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analyses.
Produced by MAPC Data Services
60 Temple Place, Boston, MA 02111 (617) 451-2770
Data Sources:
Metropolitan Area Planning Council (MAPC)
Massachusetts Geographic Information System (MassGIS)
Northeast States Emergency Consortium (NESEC)
Massachusetts Emergency Management Agency (MEMA)
Federal Emergency Management Agency (FEMA)
Lynn, MA
File Location:
K:\DataServices\Projects\Current_Projects\FDM\FDM1_Update\Lynn\
Date: June 2011


FLOOD ZONES
MAP 3
FEMA Flood Zones (draft)
Zone A - 1% Annual Chance
Zone AE - 1% Annual Chance
Zone AO - 1% Annual Chance
Zone VE - 1% Annual Chance with Velocity Hazard
0.2% Annual Chance
EARTHQUAKES AND LANDSLIDES
MAP 4
Landslides
Moderate susceptibility to landsliding and low incidence
Low landslide incidence (less than 1.5 % of the area is involved in landsliding)
Earthquakes
Epicenters
FEMA Pre-Disaster Mitigation Planning Grant
LYNN, MA
Natural Hazards Map
Flood Zones and Earthquake / Landslides
Sites
Critical Infrastructure Sites
Repetitive Loss Sites
Hydro
Water Bodies
Reservoir
Roads / Transportation
Local
Collector
Arterial
Interstate
Trains
CRITICAL INFRASTRUCTURE SITES


HURRICANES / TORNADOES
MAP 5
Storm Tracks
Tropical Depression
Tropical Storm
Category 1 Hurricane
Category 2 Hurricane
Category 3 Hurricane
1923
1944
Tornadoes
Tornado
100 Year Wind Speeds
110 MPH
AVERAGE SNOWFALL
MAP 6
Average Annual Snowfall
36.1 to 48.0 Inches
48.1 to 72.0 Inches
MAPC
dcr
FEMA Pre-Disaster Mitigation Planning Grant
LYNN, MA
Natural Hazards Map
Hurricanes / Tornadoes and Average Snowfall
Sites
Critical Infrastructure Sites
Repetitive Loss Sites
Hydro
Water Bodies
Reservoir
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Arterial
Interstate
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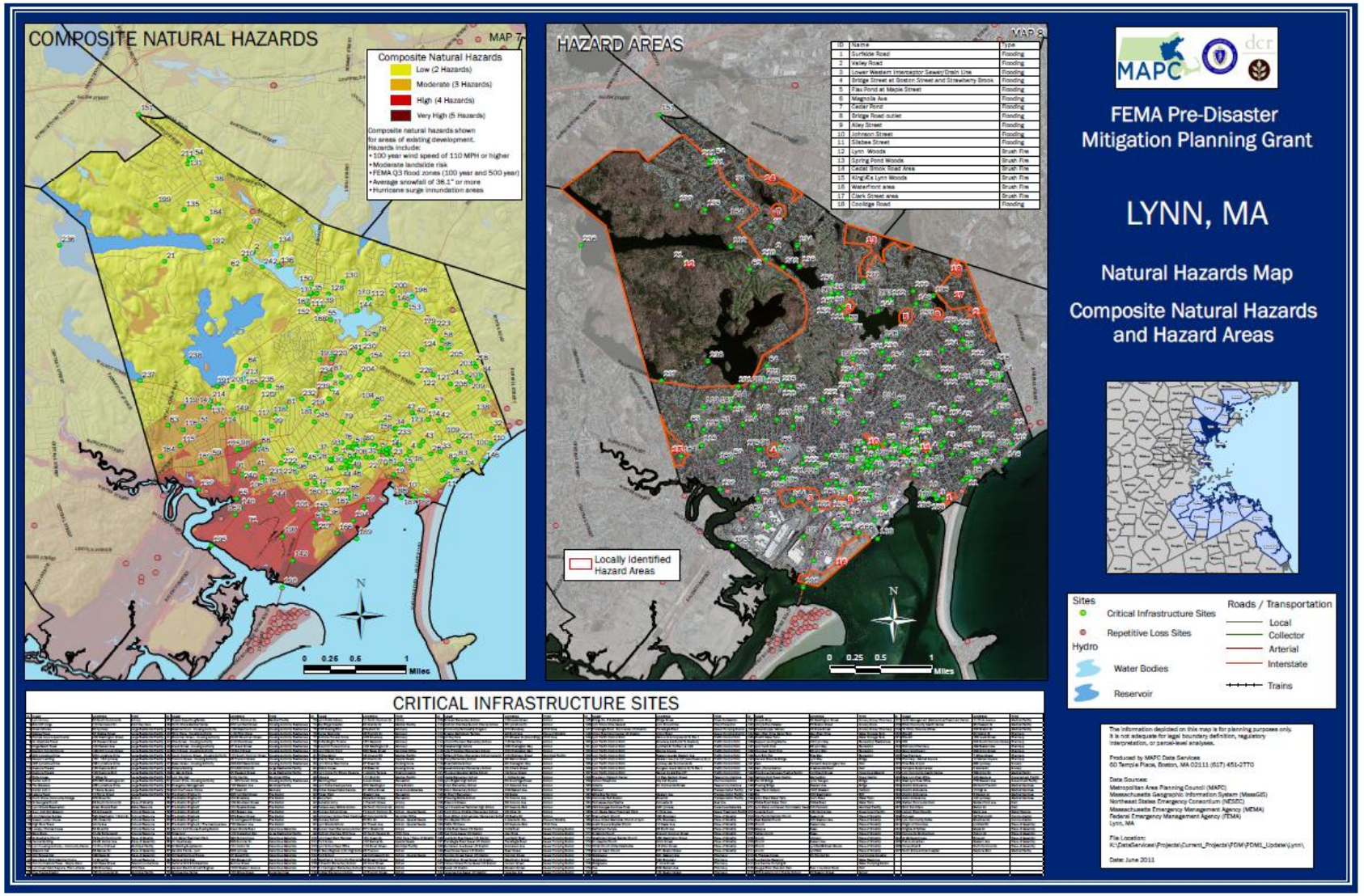
CRITICAL INFRASTRUCTURE SITES


COMPOSITE NATURAL HAZARDS
MAP 7
Composite Natural Hazards
Low (2 Hazards)
Moderate (3 Hazards)
High (4 Hazards)
Very High (5 Hazards)
Composite natural hazards shown for areas of existing development.
Hazards include:
• 100 year wind speed of 110 MPH or higher
• Moderate landslide risk
• FEMA Q3 flood zones (100 year and 500 year)
• Average snowfall of 36.1" or more
• Hurricane surge innundation areas
HAZARD AREAS
MAP 8
Locally Identified Hazard Areas
MAPC
dcr
FEMA Pre-Disaster Mitigation Planning Grant
LYNN, MA
Natural Hazards Map
Composite Natural Hazards and Hazard Areas
Sites
Critical Infrastructure Sites
Repetitive Loss Sites
Hydro
Water Bodies
Reservoir
Roads / Transportation
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Collector
Arterial
Interstate
Trains
CRITICAL INFRASTRUCTURE SITES

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APPENDIX C
DOCUMENTATION OF PUBLIC PARTICIPATION

LYNN PLANNING BOARD

ROOM 401 – CITY HALL

LYNN, MASSACHUSETTS

(781) 598-4000, EXTENSION 6816

RECEIVED
CITY CLERK'S OFFICE

2011 SEP -7 P 2:27

LYNN, MASS

September 7, 2011

Mrs. Mary Audley
City Clerk
City Hall
Lynn, MA 01901

Dear Mrs. Audley:

A meeting of the Lynn Planning Board will be held on Tuesday, September 13, 2011, at 6:30 p.m., Room 302, Lynn City Hall.

The Agenda includes a presentation of Natural Hazard Mitigation Measures.

Sincerely,

Judith Lewin-Callahan
Recording Secretary

CITY OF LYNN, MASSACHUSETTS

LYNN CITY COUNCIL
2012-2013

Ward One	Wayne A. Lozzi
Ward Two	William R. Trahant, Jr.
Ward Three	Darren P. Cyr
Ward Four	Richard C. Colucci
Ward Five	Brendan P. Crighton
Ward Six	Peter L. Capano
Ward Seven	Richard J. Ford

At-Large	Buzzy Barton
At-Large	Daniel F. Cahill
At-Large	Hong L. Nel
At-Large	John Timothy Phelan
City Clerk	Mary F. Audley

John Timothy Phelan President
Richard J. Ford Vice-President

MEETINGS SCHEDULED FOR THE WEEK BEGINNING FEBRUARY 26, 2012:

Tuesday, February 28, 2012:

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CITY CLERK'S OFFICE
2012 FEB 24 P 12:26
LYNN, MASS

Public Safety Committee, 6:45 P.M., Room 402
Discussion re: Presentation by the Metropolitan Area Planning Council re: FEMA Natural Hazard Mitigation Plan for the City of Lynn, and Other Business.

License Committee, 7:15 P.M., Room 402
Discussion re: Minor Licenses, and Other Business.

Finance Committee, 7:45 P.M., Room 408
Discussion re: Financial Transfers and Other Business.

CITY COUNCIL MEETING, 8:00 P.M., COUNCIL CHAMBERS
City Council Agenda

/tcy

Lynn City Council Office, Telephone (781) 598-4000, Ext. 6740
3 City Hall Square, Lynn, MA 01901 Fax (781) 477-7126

List of public comments received: to be shown after draft plan is posted to City web site.

APPENDIX D
DOCUMENTATION OF PLAN ADOPTION

[To be added to final plan after adoption by the City]